

THESIS

CHRONIC DISEASE PREVENTION IN COLLEGE STUDENTS: ASSESSMENT OF
PERCEPTION AND INTENTION TO USE A HEALTH MANAGEMENT APP

Submitted by

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ABSTRACT

CHRONIC DISEASE PREVENTION IN COLLEGE STUDENTS: ASSESSMENT OF PERCEPTION AND INTENTION TO USE A HEALTH MANAGEMENT APP

The relationship between intention to use a hypothetical health management app and other variables from a conceptual framework of the Health Belief Model (HBM) and the extended Unified Theory of Acceptance and Use of Technology (UTAUT2) was assessed using a convenience sample of college students (N= 176). The self-reported online survey measured perceived susceptibility to chronic diseases, perceived seriousness of chronic diseases, perceived benefits of the app, perceived barriers to the app, cues to action, social influence, facilitating conditions and intention to use the app, on 5-point Likert type scales adapted from previous studies. Multiple linear regression was used to determine relationships between the predictor variables and criterion variable. The results of the data analysis showed that individually there were a low perception of susceptibility to diseases, perception of barriers to the app and perception of social influence, and a high perception of seriousness of diseases, perception of benefits of the app, cues to action, facilitating conditions, and intention to use the app. Perceived susceptibility, perceived benefits, perceived barriers, social influence and facilitating conditions had a significant influence on college students' intention to use the app to manage different aspects of their health. However, perceived seriousness and cues to action were not found to predict college students' intention to use the health management app.

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CHAPTER 1. INTRODUCTION

College students' unhealthy behaviors like bad food choices, inactivity, alcohol, substance use and abuse, and unsafe sex could result in immediate or long-term health consequences. Some of the potential adverse effects of such behaviors include increased susceptibility to chronic diseases such as type 2 diabetes, cancer, coronary heart disease, stroke, high blood pressure, and HIV/AIDS (Sparling, 2007; Abu-Moghli, Khalaf & Bargothi, 2010; Centers for Disease Control and Prevention [CDC],2016).

According to the CDC (2016), college students are quite vulnerable to serious health issues. Nearly half of the 20 million people diagnosed with sexually transmitted diseases (STDs) every year fall within the ages range of 15 to 24. Sexual infections could lead to long-term problems such as infertility, complicated pregnancy and pelvic pain in women. Even more alarming, the CDC (2016) reported that 26% of the total of new HIV infections occur in young people that are between 13 to 24 years of age.

Another concern for college students is that they often fall prey to severe illnesses that need clinical interventions. According to the American College Health Association National College Health Assessment (ACHA-NCHA, 2016), 56.6 % of undergraduate students (45.4 % males, 61.8 % females), reported being diagnosed by medical professionals with psychiatric conditions (9.2 %), chronic illnesses (e.g., cancer, diabetes, auto-immune disorders) (5.3 %) along with Attention Deficit and Hyperactivity Disorder (ADHD) (8.7%).

Despite the universal prevalence of health problems among college students, many remain unaware of the consequences of their unhealthy choices because they don't consider themselves as typical drinkers, smokers, etc. and don't realize that these unhealthy lifestyle choices can result in

a severe and even irreversible impact on the quality of their health. As noted by Wechsler, Nelson & Weitzman (2000), a majority of the heaviest drinkers don't think they have a drinking problem and that they need help. As for other risky behaviors among college students such as cigarette smoking, smokers can be categorized into two groups: daily and nondaily smokers (Sutfin et al., 2013). Nondaily smokers who smoke cigarettes intermittently, for example, only on the weekends during parties, do not believe they are smokers who need health support to deal with the risks associated with smoking, even episodic and quitting process. Therefore, they continue to indulge in risky behaviors that can potentially lead to more serious consequences that will necessitate a medical intervention (Eckert, 1989; Jessor & Jessor, 1977). If nothing is done regarding behavior change interventions during their college days, they may develop chronic diseases either immediately or in the future because of risky choices they made during their time at colleges and universities.

College students' tendency to indulge in problematic health-related behaviors, like unhealthy eating, and unsafe sexual habits, could stem from the challenge of transitioning to a college life characterized by a newly acquired individual autonomy and free will (Cooper, 2000), constant peer pressure and need for socializing, ignorance of the dangers related to risky behaviors, and denial of those risks. (Cooper, 2002; Burk, Vorst, Kerr & Stattin, 2011; Kremer & Levy, 2008; Perkins & Berkowitz, 1986; Wechsler, Lee, Kuo & Lee, 2000; Wechsler, Davenport, Dowdall, Moeykens & Castillo, 1994; Nelson, Story, Larson, Neumark-Sztainer & Lytle, 2008).

Some traditional medical services exist on campuses to support college students' health. According to Anglin, Naylor, and Kaplan (1996), the school-based health centers (SBHCs) seek to increase access to complete health services for students, particularly students from limited resources families. The SBHCs deliver the most current health services to prevent, treat illnesses

and follow up with college students who seek medical help from health workers on campuses. Other advantages of medical facilities at the schools include ideal locations where most young people spend most of their time, the inclusive characteristic of the health services, and the links between community members and schools (Mason-Jones et al., 2012).

However, some issues impede the proper functioning of the medical infrastructures on which colleges and campuses rely. One of the critical problems is the financial difficulties encountered by universities which need to provide resources not only for health programs but all services (Eifert, Hall & Kondor, 2017). Because of tight budgets, universities deliver health promotion interventions based on quantity rather than quality. Besides lack of substantial financial means to deploy optimal health promotion strategies, college students themselves under use on-campus health programs for various reasons. Barriers to help-seeking include lack of time, medical confidentiality concerns, lack of health workers' empathy, financial problems, lack of perceived need for help, unawareness of medical services and insurance coverage and stigma (Hunt & Eizenberg, 2010). Negative attitudes toward help-seeking seem to be greater for college students coming from low-income families and international students (Eisenberg, Downs, Golberstein, & Zivin, 2009).

Thus, traditional medical settings and health promotion strategies showed a limited success regarding disease prevention among college students due to factors such as the ones mentioned above. Therefore, a need for innovative and practical solutions to diversify medical service delivery and health promotion strategies among students is pressing. Fortunately, mobile health is a promising alternative to traditional prevention services offered by medical facilities on campuses. Riley et al. (2011) used terms such as "evolution" and "revolution" to describe computer-based

health interventions, new mobile technology, and health services that are positively transforming the health care system.

Young people such as college students are often fond of new technology. They use the internet, smartphones and other mobile devices with apps on a regular daily basis for activities such as information seeking, entertainment, socializing, communicating and physical activity (Globe Newswire, 2013; Steve, 2002; Acquisti & Gross,2006; Gowin, Cheney, Gwin & Wann, 2015). College students' familiarity with technology presents a unique opportunity for an innovative approach to their health education via mobile health (Dahlstrom, Walker & Dziuban, 2013). From a mobile app perspective, the present study aims to look at a model that can predict college students' intention to use a mobile health app to prevent current chronic diseases.

The decision to investigate college students' intention to use a health management app to support a healthier life based on their perception toward threats such as avoidable severe diseases stems from their seeming lack of awareness of those threats and subsequent negative consequences. This decision is primarily driven by a desire to understand their current perception of diseases and their intent to adopt an app that would help them manage critical aspects of their health. However, before encouraging students to adopt healthy behaviors, it seems logical to evaluate their current beliefs, opinions, attitudes, and behaviors toward chronic diseases. It is crucial to have a conversation with them to understand their perceptions regarding chronic conditions to see whether they feel they are at-risk. Then, this essential assessment might allow for a refinement in health communication efforts to trigger increased awareness and motivation to take action for their health through their own mobile devices and smartphones.

Therefore, to assess perceptions toward chronic diseases and intent to use a future app, the current study incorporates main factors that might influence the adoption of the future app to

support healthier choices by college students as explained and predicted by key constructs in the Health Belief Model (HBM) and the extended Unified Theory of Acceptance and the Use of Technology (UTAUT2). The study will examine the relationships between constructs such as perception of susceptibility to chronic diseases, the seriousness of chronic diseases, benefits, barriers, cues to action, social influence, facilitating conditions, and intention to use a hypothetical health management app.

1.1 Goal and Research Question

Our goal while conducting this study is to understand college students' intent to use a health management app based on their perception of susceptibility to current chronic diseases, the severity of those diseases, benefits, barriers, cues to action, social influence and facilitating conditions.

With this goal in mind, the following over-arching research question is proposed:

Research Question: What are the factors that influence college students' intention of using a health management app?

1.2 Organization of Proposal

The proposal will be organized around the following chapters. Chapter 1 introduces the study. Chapter 2 discusses the literature and theoretical framework of the research. Chapter 3 covers the methods section, which includes a cited background of the method, recruitment, participants, and procedures. Chapter 4 describes how the results and discussion will be conducted. Chapter 5 summarizes the study, including a critical analysis of the limitations related to the study.

CHAPTER 2. LITERATURE REVIEW

A substantial amount of research has been conducted to examine strategies that could be used to prevent chronic diseases and promote healthy behaviors among the younger population, particularly among college students (Black, Coster, & Page, 2017; Rozmus, Evans, Wysochansky, & Mixon, 2005). The interventions used both traditional and digital strategies to promote healthy behaviors among the college population (Hollis et al., 2017; Dunne, & Somerset, 2004; Pagoto & Bennett, 2013).

2.1 Traditional vs. Digital Health Interventions for Chronic Diseases

Health programs for college students have evolved over the years. Current health programs can be classified into two main types: traditional and digital health interventions.

Traditional health interventions include health services by healthcare facilities on campuses, health-based courses and seminars, educator-delivered interventions via focus groups, and lectures or conferences, face-to-face discussions, etc. The latter involves two of the most effective techniques; in-person discussions such as Brief Motivational Intervention (BMI) and personalized normative feedback (Collins, Carey & Sliwinski, 2002; Carey, Carey & Maisto, 2007). BMI is a short health program designed, for example, to reduce risky alcohol use and related problems, increase awareness either in persons or web-based among young people; while personalized normative feedback is tailored feedback to the individual to correct a misperception about norms that influence heavy drinking. In addition to these approaches that work on the individual level, another significant traditional health effort is embedded in social marketing in which the use of audiovisual and printed media can reach the masses. According to Lewis and Neighbors (2006), social marketing is a contemporary mass communication approach for health

education purposes among college students. Moreover, brief interventions have demonstrated efficacy in reducing risky behaviors such as heavy alcohol intake, cigarette smoking (e.g., both social and regular smoking), poor diet intakes, and unprotected and unplanned sex (Neighbors, Lewis and Larimer, 2004; Berg et al., 2009; Lantz et al., 2000; Peterson et al., 2010; Kelly et al., 2013; Kanekar & Sharma, 2010).

Despite the success related to traditional interventions, especially with regard to the increase of knowledge and awareness about the above health issues, certain drawbacks need to be considered for their efficacy. The social marketing that relies on the use of media is criticized for being relatively distant and impersonal. Also, while brief interventions seem excellent for short-term effects, concerns remain about their ability to influence long-term results and a sustained behavior change. This is why some researchers recommend that health programs not only work to achieve short-term goals but also long-term goals for long-lasting behavior change and health outcomes. For Prince, Maisto, Rice, and Carey (2015), a need exists to improve the potential of effective current health interventions that intend to reduce, for example, the risks associated with heavy drinking among college students.

According to the prevalent literature, college students avoid using traditional interventions for many reasons. One reason is that college students are more comfortable using electronic means than conventional ways to seek help (Kitsantas & Chow, 2007). They prefer to look for health information or contact health professionals online instead of going physically to medical facilities.

Another reason for avoidance can be attributed to the college students' low health risk perception with regards to the dangers of heavy drinking (e.g., episodic binge drinking), cigarette smoking (e.g., social smoking), unhealthy foods (e.g., regular fast-foods on the go) and unsafe sex (e.g., serial monogamy). According to Haile et al. (2016), the low-risk perception of chronic

diseases such as HIV in the college and the general population is a real issue and constitute a barrier to safe sex. Beyond HIV, researchers were concerned with low-risk perception, lack of knowledge of cardiovascular risk factors by individuals who might get this chronic disease (Tran et al., 2017). Thus, young people such as college students are more and more interested in online health information and show low-perception of risks related to diseases.

In addition to the low perception of the severity of chronic diseases, another behavioral pattern enacted by individuals facing health threats is information avoidance. Sweeny, Melnyk, Miller, and Shepperd (2010) define information avoidance as a behavior enacted to thwart or obstruct the knowledge of accessible but unpleasant information. Thus, as posited by Case, Andrews, Johnson, and Allard (2005), humans tend toward information avoidance, ignorance or denial to reduce anxiety. This attitude is particularly true when it comes to individuals' stress related to personal risks to serious illnesses. Many individuals would indeed prefer not to know how likely they are to develop a chronic disease if they see they are at higher risk based on their current behaviors.

Studies also revealed that stigma was an obstacle to seek help with traditional care professionals. According to Gajecki et al., 2014, stigma related to alcohol overconsumption might prevent students from accessing health resources available on different campuses. The authors argued that shame was a psychological barrier to seeking help in medical facilities located on campuses.

Moreover, the lack of awareness, low-perception, and denial of the risk factors associated with significant health issues by students who consider themselves as social drinkers and smokers, but not real and regular drinkers/smokers, etc. need to be addressed. For example, many young

people believe alcohol has more benefits than drawbacks because it allows them to manage their stress and to socialize (Fisher, Fried & Anushko, 2007).

Finally, one of the serious difficulties about using media and professional health educators is the cost. Media advertisements and the face-to-face approach are expensive interventions and not cost-effective compared with digital health interventions. As posited by Wellings and Macdowall (2000), mass media are helpful in reaching a broader public and increasing awareness of health issues but are not seen as cost-effective by some researchers.

Digital health interventions (DHIs), like media communication and face-to-face intervention, are more channels of communication than solutions. Digital health interventions refer to interventions transmitted through new technology tools that include smartphones, website, text messaging, etc. to offer health programs that work, are less expensive, and can reach a larger population (Murray et al., 2016). All these ways of communication are used in a multifaceted campaign. Therefore, they are not contradictory; they are complementary.

Moreover, digital intervention is likely to be adopted by college students who are heavy users of digital tools such as mobile devices and smartphones. As West et al. (2016) posit, technology is an appealing tool for health campaigns against obesity because it has the capability to reach out and attract more college students. They are members of a population segment that has substantial technology skills (Howe & Straus, 2000). They are also called "Millennials, NetGen, Generation Y, Homo Zappiens, and Digital Natives" (Margaryan, Littlejohn & Vojt, 2011) to emphasize the fact that they are a new generation entirely born and raised in the digital era. Thus, one of the principles of successful behavior change communication will be to align the communication strategy with the college students' communication habits and preferences for receiving and exchanging information.

2.2 Pros and Cons of Mobile Interventions

Mobile interventions display advantages as well as disadvantages that health promoters need to be aware of for optimal use.

Identifying the main advantages of healthcare using mobile devices, one can think of the ubiquitous or prevalent quality of this technology. It is the fact that mobile devices and particularly connected cell phones are carried by users everywhere they go (Whitettaker, 2012; Fogg & Adler, 2009). The positive attribute of mobile health technology is its capacity to create methods to collect data related to biology, behavior, and environment (Kumar et al., 2013). This technology allows for data gathering that is possible in an individual's home and beyond traditional facilities like hospitals and clinics. Mobile health technology can not only collect information but it also substantially increases the amount of data collected from a large number of individuals over a short period. Thus, in the event of an epidemic, it may be helpful in gathering vast amounts of data rapidly and also with surveillance in locations that have internet connection.

Another promise of mobile technology is that it can tailor and customize communication in real time with effects on time reduction, positive compliance and efficacy of efforts (Collins, Murphy & Strecher, 2007; Lizotte, Bowling & Murphy, 2010). Furthermore, mobile health technology is useful in monitoring and managing medical treatment. Health workers use it to send notifications to patients for their treatments (Mustang, Raij, Ganessan, Kumar & Shiffman, 2011).

However, when asked about their reluctance to use mobile health technology, some researchers reported on behalf of end-users regarding some flaws and pressing concerns. In a brief but insightful article, McNiel and McArthur (2016) gave details about how some nursing students, in an evidence-based approach, discovered with astonishment the inaccuracies and misinformation such as wrong health outputs and vitals readings that some current apps conveyed. Incomplete and

inaccurate information can be harmful to patients, and the nursing students felt the responsibility to help their patients navigate through the plethora of available apps by teaching them the necessity to evaluate the apps before their actual use.

This concern is also shared by Hanrahan, Dy Aungst, and Cole (2014) in their contention that flawed diagnoses are common in health apps. Very often, apps don't perform in the way they were intended to and as expected by users. The threat is real in the sense that malfunctions could cause an immediate danger to persons who suffer from medical conditions. Another bad practice is related to the irresponsibility of app authors. Many authors do not have the medical knowledge. In a study by Carter et al. (2013), it was shown that just 27% of the apps stated that one of the staff members in developing the apps was a physician or medical professional. Also, many app developers plagiarized medical information from literature, and that situation very often led to legal challenges because of unethical relationships between some app developer and writers of articles.

Perhaps, the most fearful threat is the privacy breach of health app users. A study by Barcena (2014) reporting the Global Privacy Enforcement Network testing of 1000 apps, discovered that 60% of them contained privacy flaws. These apps were unclear about how personal data would be used and always requested for more information than necessary. It is suspected that hidden commercial interests were behind this strange practice of app developers (Barcena, 2014), and that is problematic because it could violate privacy and confidential data such as health and personal information.

2.3 Prior Studies About Using Digital Health Interventions

Despite the disadvantages mentioned above, many studies have used digital health intervention techniques because the advantages of using such interventions outweigh the

disadvantages. Digital health interventions which target young people and particularly college students have been reported in various studies. The most common health behaviors reported in research studies include sexual health, binge drinking, cigarette smoking, nutrition, mental health, and physical activity.

Concerns about college students' health have led to increased interest regarding innovative ways to improve their health. Among those health concerns, college students' sexual behavior has been studied from a technology-based perspective. According to Kanuga and Rosenfeld (2004), the internet is a key route for delivering sexually-related health information to young people nowadays. The internet also plays a key role in the development and marketing of various products such as mobile devices and smartphones which are used by many health promoters and researchers to deliver health solutions adapted to young people. Richman et al. (2014) examined college students' sexual behaviors and found that female students were interested in utilizing app functionalities such as period tracker, birth control reminder, Sexual Transmissible Infections (STIs) and pregnancy symptom checker, whereas men were more likely to use apps that displayed alternatives for physical sex, safer sex, and trivia.

Furthermore, some researchers in their attempts for innovative solutions conducted randomized controlled trials via Interactive Computer-Based Interventions (ICBIs). ICBIs are programs designed to collect field information to support decision making, behavior change, and use of emotion in messaging for health problems (Bailey et al., 2010). ICBI was used to assess many aspects of sexual health that comprised cognitive, intentional, attitudinal, behavioral and biological outcomes. Even though researchers found mixed results for the above health outcomes, they concluded that knowledge, self-efficacy, and intention were potential mediators for better health outcomes (Bailey et al., 2010).

Another prevalent health problem among college students is obesity. According to the American College Health Association American College Health Association - National College Health Assessment (ACHA-NCHA) (2006), 3 of 10 college students were classified in the category of overweight with a body mass index (BMI) of 25.0–29.9 kg/m² or obese (BMI) \geq 30.0 kg/m². The reality is that obesity has become an epidemic in the United States because this health issue affects all age groups and represents serious risk factors that cause increased morbidity and mortality (Flegal, Carroll, Ogden & Johnson, 2000; Ogden, Flegal & Johnson, 2002). Thus, research has been conducted to mitigate the risk factors. Various strategies were used as reported in the literature. Web-based programs, for example, have the potential to alter young people's nutrition and physical activity (PA) (Baranowski et al. 2003; Jago et al. 2006). A study conducted by Thompson et al. (2008) deployed an ICBI to see whether at-risk African American adolescents could change their fruit, juice, and vegetable (FJV) intake, increase physical activity and self-efficacy. The results of the randomized controlled trial showed the adolescents in the two groups (with no control group but an incentive schedule that was either immediate or delayed) increased their fruit, juice and vegetable consumption, FJV self-efficacy and physical activity. Another group of researchers, Franco et al. (2008), were interested in a computer-based tool to inform and educate college students about the importance of a healthy diet. They encouraged some volunteers to track their fruit, vegetable and fat intake online. Although the students' fruit and vegetable intake increased for a short time, this healthier eating behavior was not maintained.

Moreover, unhealthy lifestyles such as cigarette smoking and binge drinking are more and more common behaviors observed in college students. There are decades of health programs to prevent college students from enacting these risky behaviors with limited success. Some researchers continued to try new strategies to reduce the negative health outcomes of smoking and

drinking. For better early prevention of smoking among adolescents, for example, researchers using computer-tailored messages could show a delay in tobacco use. That was the case with de Jong et al. (2014) who conducted a trial among students to prevent them from smoking. The sample was divided into two groups: a computer-tailored intervention group and a control group. Adolescents in the intervention group were less likely to initiate smoking after six months.

In addition to smoking prevention, some of the actual smokers were involved in randomized controlled trials to quit smoking. A study purported to execute a smoking cessation program among college students confirmed that mobile phone text messaging was effective in disseminating tailored health messages as well as reducing cigarette consumption (Riley, Obermayer & Jean-Mary, 2008). The researchers, indeed, succeeded in changing daily smokers' behaviors six weeks after the beginning of the intervention; resulting in some participants who completely quit smoking or had drastically reduced their smoking habits. Thus, text messaging motivated smokers to change their habits into healthier ones.

By necessity, we can't discuss college students' health issues without mentioning alcohol consumption. The National Institutes of Health (NIH) and the National Institute on Alcohol Abuse and Alcoholism (2015) define binge drinking as a tendency to drink in such a way that brings blood alcohol concentration (BAC) level to 0.08 g/Dl within 2 hours. In other words, it is a critical amount of alcohol that corresponds to more than four drinks for women and five drinks for men within 2 hours. The NIH (2015) revealed that in recent years alcohol abuse among college students caused nearly 2, 000 deaths from severe injuries in motor-vehicle accidents; 700, 000 assaults by drunk students; and 100, 000 sexual assaults by drunk students or partners. In addition to these immediate negative effects, the abuse of alcohol can cause severe health conditions. While only one binge drinking episode may not cause health problems, college students who engage in

multiple binge drinking occasions are at-risk for developing serious health issues (Wechsler & Nelson, 2001). Thus, there are short-term (e.g., intoxication, unsafe sex, unintended pregnancies, STDs or HIV) and long-term (e.g., High blood pressure, heart disease, liver disease and cancers) negative health outcomes (CDC, 2016). To try to alter this drinking pattern among college students, some researchers advocated for technology-based health promotion interventions in addition to traditional health programs. One of the reasons was that young people with an alcohol problem, more than adult drinkers, showed an increasing interest in computerized normative feedback (Koski-Jannes & Cunningham, 2001).

Regarding the tenency of some young adults to abuse alcohol, some researchers asked a question that seemed fundamental: "What is a Standard Drink?" These researchers thought that knowing what a standard drink is and what it looks like would help the young adults track their drinking. This question/answer was retrieved from the Saying When App (n.d.), an app designed to prevent alcohol abuse. One of the risks associated with alcohol use and abuse is that many people do not know the limit they should impose on themselves while drinking alcohol. Therefore, it is crucial to help them track their drinking habit and avoid any abuse. Even though the app does not send tailored feedback to the user, it does help to set a goal. Researchers such as Carra and colleagues (2016), reported the potential of the Digital-Alcohol Risk Alertness Notifying Network for Adolescents and Young Adults (D-ARIANNA), which is an app that intended to assess risk factors and send tailored messages to users who have answered the embedded questionnaire. Based on the user's responses, D-ARIANNA provides different tips depending on the strongest risk and protective factors. Thus, contrary to the first app mentioned above, the latter app allows for more engagement and feedback. These are essential features and functionalities in health apps to engage people including those who are suffering from mental health discussed in the next paragraph.

Mental health disorders are also common in the United States. This country has one of the highest depression rates among nations in the world. One in five American adults has a mental illness, one in ten young people suffers from depression, one in twenty five Americans are diagnosed with a serious mental health disorder that includes schizophrenia and severe depression, and each year tens of millions of people are affected, of whom roughly half will receive a treatment (Mental Health Gov., 2017; The National Institute of Mental Health [NIMH], 2017). Therefore, health interventions such as computer-based mental health promotion are encouraged. First, people use websites such as medical journals, commercial health sites, and research centers to seek health information (Taylor, 2002). Second, online support groups have become popular so that individuals who have a mental health issue can join a group to anonymously share their experiences and support each other (Boyer, Provost, & Baujard, 2002). Third, Lange et (2000) developed an Internet-based program as an online therapy support between a specialist and college students, while others applied a protocol-driven cognitive and behavioral therapy for people living with a posttraumatic stress disorder to alleviate issues related to depression and sleeping and found that some participants appreciated the anonymity aspect and others would like to have a one-on-one contact with a therapist too. Fourth, another group of researchers evaluated the effect of an app called SuperBetter on users to decrease stress and other symptoms of depression (Roepke et al., 2015). They discovered in their study that the game-like app was engaging and helping in reducing those depression signs. Finally, Virtual Reality is looked at in the perspective of its efficacy in reducing anxiety and depression. According to Granic (2017), DEEP-VR is a unique VR video game that allows players to navigate sensations underwater. They learn how to control their movement and breathing in that environment. DEEP-VR utilizes a theory-based method that allows users to practice managing and overcoming feelings of anxiety and depression by playing

the game. Thus, a variety of computer-based tools are used to support individuals in dealing with mental health issues that are also combatted by the practice of physical activity.

Physical activity (PA) is the last but not the least health-related research topic to be discussed here. Researchers have also recently found that PA and diet help people to lose weight, not just physical activity or exercise alone (Cloud, 2009). It is a way to emphasize that both health behaviors work well in combination to reduce overweight and obesity and related chronic diseases. PA itself is a key practice recommended by health promoters and innovators because the use of apps on mobile devices and smartphones can allow for better health achievements. According to Walsh, Corbett, Hogan, Duggan, and McNamara (2016), mobile phone apps have a significant ability to not only increase physical activity but also provide goal setting, improve self-monitoring, and give instant feedback. Promoters usually combine Apps, sensors, and trackers as each of them is a key component to physically and physiologically track PA. In the category of apps, Carter, Burley, Nykjaer and Cade (2013), for example, developed My Meal Mate(MMM) an app intervention on the model of other smartphone apps such as MyFitnessPal to set a goal, self-monitor diet, and activity, and receive weekly text messaging feedback. Researchers used a randomized controlled trial (RCT) by comparing the app group to two other groups that were a website and diary groups and concluded based on the results that the MMM app was a real alternative to lose weight. In the category of sensors and trackers, Tudor-Locke and Myers (2001) found that pedometers, which register steps taken during walking and running activities, were successful in tracking small increases in walking by obese individuals who have a sedentary habit, while PA diary users were not successful.

Another PA sensor is the accelerometer used to detect acceleration of the body. According to Troiano et (2008), the Actilife 5.5. software could count and measure the time for sedentary

positions and other levels of PA intensity. In a study that used a sensor tool, adults' acceleration and sedentary positions were tracked with reliability and validity. In addition to pedometers and accelerators which are more popular among young adults, there is Exergaming, a novel technology that may increase physical activity through video gaming, and is especially useful in the adolescent and school population (Wittman, 2010). During a study of that technology, the researcher measured the adolescents' exertion level, activity enjoyment, heart rate and steps. She concluded that exergames increased children's physical arousal, enjoyment, heart rates and sufficient pedometer counts for achieving a PA goal.

In conclusion, there are many research studies related to digital health interventions and the most common health issues addressed by these interventions included sexual health, cigarette smoking, binge drinking, obesity, mental health and physical activity among young adults, including college students.

However, not all digital health interventions have been successful in impacting all sections of the population. Some researchers recognized that it was essential to increase accessibility, usability, and credibility of digital health interventions for more and different categories of people, including people with literacy or cognitive difficulties (Maher, 2014; Rotondi et al., 2007). If health agencies and promoters wanted to impact more people in public health with organized responses, they needed to address the overall accessibility and credibility of new technology health tools by hard-to-reach people, minorities and people with literacy problems. For example, one could ensure that all students have access to mobile platforms (e.g., tablets, laptops, smartphones) connected to the internet to efficiently implement mobile health solutions on campuses.

Also, minority populations may have specific needs such as language and cultural barriers that need to be assessed and addressed to reach them effectively. Furthermore, lack of credibility

is a substantial obstacle to optimal health promotions via mobile health technology due to many factors such as lack of evidence-based solutions, and persisting privacy and accuracy concerns. Discussing the credibility issue with mental health apps, for example, Bakker, Kazantzis, Rickwood, and Rickard (2016) reported that a considerable number of mental health apps do not display necessary features for better functionality and most importantly, promoters almost never use or publish scientific trials to validate their apps.

Privacy is also a primary mobile health concern because not all mobile health apps are regulated, reviewed or protected (McArthur, 2001). Because technology-based health promotion tools offer an array of opportunities for sharing and collecting information, apps can put users at risk in a variety of different ways (McArthur, 2001). Another problem related to the credibility of mobile health technology is that it does not do what it is intended to do or it may malfunction issues. Furthermore, app use does not guarantee that the users will meet their goal (Laing et al., 2014), and those who use phone devices must always ensure they provide accurate data/assessment (Husain & Spence, 2015). Thus, users of mobile health technology can be disappointed because of flaws and inaccuracies in apps that would discourage further use of them.

Despite some disadvantages of using technology-based health promotion, researchers and end-users are excited at its potential in mitigating various health concerns. They are motivated to examine and use such a digital health intervention. According to Larimer et al. (2004), computer delivery health campaigns become more and more popular because of their lower cost and ease of use. These cost-related and usability preferences were confirmed by Choi and Stvilia (2014) who were also interested in college students' motivation in adopting fitness apps. The authors concluded that college students preferred apps that were free, easy and simple to use. Students were also motivated to use an app by other people's ratings and comments and by using the apps themselves.

As for Cunningham, Humphreys, and Koski-Jannes (2000), one of the observed advantages of the internet by young adults is its appealing feature for personalizing feedback interventions.

In conclusion, current health problems were targeted by researchers in their attempt to use new technology to support or supplement traditional health services delivery. However, concerns about accessibility, usability, and credibility were raised because many computer-based health technology promoters did not use evidence-based studies to validate their tools for users who were motivated to try new health solutions despite recurrent flaws.

2.4 Theoretical Framework for This Study

Besides research on the relationship between diseases and use of new technologies, the present study follows two theories which are the Health Belief Model (HBM) and the extended Unified Theory of Acceptance and Use of Technology (UTAUT2). Both theories have been used in various studies by social scientists and public health researchers. The HBM is one of the most employed theories in behavioral and health sciences (Janz & Becker, 1984), while UTAUT 2 is more focused on behavioral intention in the context of acceptance and adoption of technology solutions (Chang, 2012).

The HBM pertains to people's opinions on a health issue plus opportunities and skills in dealing with it. The HBM explains how individuals' beliefs related to health issues, the perception of benefits of an action and self-efficacy results in whether they engage in the desired health behavior or not (Carpenter, 2010). Also, the HBM posits that a person might enact the desired action when the person sees he/she is likely to get a serious disease and suffer from the severe consequences of that disease (Janz & Becker, 1984; Rosenstock, 1974).

Prior studies applied the HBM to investigate health behavior questions related to current health issues such as obesity, cancer, depression, cigarette smoking, alcohol drinking, HIV/AIDS

etc. The HBM was applied by researchers to predict desired behaviors such as college students' body mass index (BMI) based on their weight-related beliefs (McArthur, 2017), breast self-examination (BSE) on the basis of psychosocial predictors (Didarloo et al., 2017), consistent use of condoms with levels of perceived susceptibility and threat (Ndabarora & Mchunu, 2014), and alcohol preventive actions by emphasizing social norms among college students (Champion et al., n.d.). The HBM was also used to predict individuals' likelihood to enact unhealthy behaviors. For example, smoking initiation was predicted among young people, given their level of constructs such as knowledge, attitude, perceived benefits, self-efficacy and cues to action (Mohammadi et al., 2017). Thus, researchers used the HBM to predict healthier behaviors as well as unhealthier ones based on the individuals' beliefs, perceptions and the environment where they live.

As for the UTAUT2 Model, it is an extension of the Technology Acceptance Model (TAM) and then adaptation of UTAUT, it encompasses key constructs such as performance expectancy, social influence, effort expectancy, facilitating conditions, hedonic motivation, price and habit that influence a person's acceptance of technology (Venkatesh, Morris, Davis & Davis, 2003; Venkatesh & Thong, 2012). These are appealing technology attributes to match peoples and particularly college students' preferences in terms of mobile health technology usability.

The UTAUT 2 is a relatively new theory as compared to the Health Belief Model discussed above. However, researchers have used the UTAUT2 in various studies that included technology acceptance at individual, social and organizational levels in different activity areas that go beyond public health. A study showed that participants were willing to use and keep using fitness apps that met performance expectancy, hedonic motivations, price value, and habit (Yuan et al., 2015). Also, a group of consumers in research reported they would be interested in a shopping via the internet if it was fun, helpful, recommended by significant others, and promoted in a facilitating

environment (Yang, 2010). Furthermore, smart TV garnered consumers' attention for its advantageous, compatible, enjoyable, performance features (Bae & Chang, 2012). Contrary to young adults who may have higher computer literacy, special categories of people such as elderly people may have difficulties using new technology. Thus, some researchers insisted on the adaptation of new technology to specific groups of individuals. For instance, Murugesh-Warren et al. (2015), found that as age increased, people's ability to use technology in healthcare systems decreased. It was likely that when individuals became elderly, they had difficulties related to psychomotor ability, ease of processing and increased distraction due to unnecessary things on the technology device used. That is why it is important to carefully consider specific end-users' technology preferences and level of computer literacy to encourage them to become excited and satisfied adopters of new technology.

Both theories relate to each other on their capacity to predict intention depending on the individual's perception of two essential objects in the study: chronic diseases and a mobile health app. The HBM theory may influence readiness for prevention, and the UTAUT2 theory is likely to motivate the user to take actions like adopting a health app. Thus, what brings both theories together is their predictive characteristics to respectively enact a desired health behavior and adopt a new technology. The prediction is based on the assessment of unhealthy behaviors, likelihood of negative health consequences, and intention to take actions on one hand, and evidence of the attractiveness of a new technology and intention to adopt it to prevent chronic diseases from happening on the other hand.

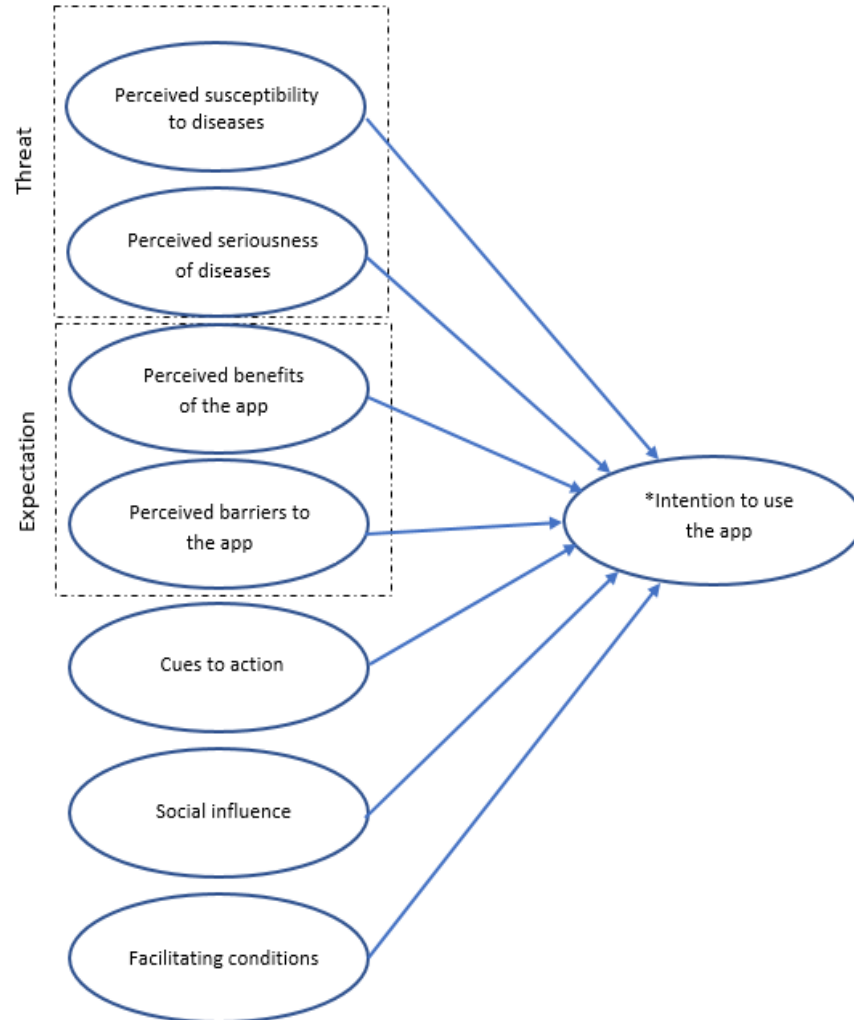


Figure 1. Health Belief Model and UTAUT 2 Conceptual Framework

*Intention to use the app encompasses the other UTAUT2 constructs that include Performance expectancy, Effort expectancy, Hedonic motivation and Price used to describe an ideal hypothetical app for college students to manage different aspects of their health. Habit is not included because it represents actual use of the app.

Therefore, the constructs of interest in the present conceptual framework include the Health Belief Model and related constructs such as perceived susceptibility, perceived seriousness, benefits, barriers and cues to action. Perceived susceptibility refers to an individual’s likelihood to develop diseases. Perceived seriousness is about an individual’s belief in the negative consequences of diseases. Benefits indicate the advantages of a recommended healthy behavior. Barriers are obstacles to the desired behavior. Cues to actions refer to internal and external reminders to enact a positive response.

On the other hand, the constructs of the UTAUT2 model which are relevant in the present framework encompass performance expectancy, effort expectancy, hedonic motivation, price, social influence, facilitating conditions and intention to use. Performance expectancy refers to when individuals' belief that new technology can help perform a specific task. Effort expectancy means people's perceived ease of use of new technology. Hedonic motivation is about the enjoyment and fun that a new technology provides to users. Price is usually the monetary cost related to the possession of new technology. Social influence refers to friends, peers, colleagues or family members who influence how individuals adopt new technology. Facilitating conditions are continuous services offered by promoters of new technology for its ease of use. Finally, intention to use means a desire to adopt new technology.

2.5 Research Question and Hypotheses

Research Question: What are the factors that influence college students' intention of using a health management app?

From this question, the following hypotheses can be examined:

- Hypothesis 1: Perceived susceptibility to
 - a) Lung cancer
 - b) High blood pressure
 - c) Type 2 diabetes
 - d) HIV/AIDS
 - e) Heart disease
 - f) Mental health

will be positively associated with intention to use the health management app.

- Hypothesis 2: Perceived seriousness of

- a) Lung cancer
- b) High blood pressure
- c) Type 2 diabetes
- d) HIV/AIDS
- e) Heart disease
- f) Mental health

will be positively associated with intention to use the health management app.

- Hypothesis 3: Benefits will be positively associated with intention to use the health management app.
- Hypothesis 4: Barriers will be negatively associated with intention to use the health management app.
- Hypothesis 5: Cues to action will be positively associated with intention to use the health management app.
- Hypothesis 6: Social influence will be positively associated with intention to use the health management app.
- Hypothesis 7: facilitating conditions will be positively associated with intention to use the health management app.

CHAPTER 3. METHODS

3.1 Theoretical Framework of the Method

The overall question of the present research is: What are the factors that influence college students' intention of using a health management app?

An online survey by Qualtrics was used to collect data. According to Wimmer (2014), surveys are of two types: descriptive and analytical. A descriptive survey is designed to gather information that describes what is going on now while investigating a situation. An analytical survey goes beyond the present situation and tries to explain the reasons why the situation is prevailing. This study followed the analytical survey approach.

Conducting surveys online can be an appropriate means of collecting data from people because of the following reasons. According to Dillman, Smyth, and Christian (2014), a survey is a data collection method that allows researchers to accurately gather information on specific patterns about a large number of a population by using a sample of it. Thus, because of some resource and time constraints, it is almost impossible for researchers to conduct an ideal census of a population for a study, and surveys are reliable alternatives.

An online survey, for example, is a relatively simple method that usually starts with a contact with future participants via telephone, mail, and email, followed by a direct access to the survey via a link or an access code to a website where the survey is located, and finally a button to submit the self-reported answers (Wimmer, 2014). Thus, an online survey offers advantages such as cheap but reliable data collection method and respondents' convenient and flexible time management.

Prior studies used online surveys to investigate some phenomena. One of them was conducted by Miller, Chandler, and Mouttapa (2015) who used a mixed method via an online survey and a focus group to look at college students' needs in the context of developing an app to promote health. Students in both method groups indicated stress management, nutrition, and physical activity as the three highest priorities for their health. Another study was carried out by Choi and Stvilia (2014) who wanted to know how college students selected their health apps. The authors also used a mixed method that included a survey and an interview to collect data. Respondents who were college students selected caloric intake and physical activity as areas in which apps could be useful for them.

What's more, Cho, Quinlan, Park, and Noh (2014) utilized an online survey to focus on factors that determined the adoption of health apps by college students. That survey method found, on the one hand, that college students' perception of the usefulness of apps was associated with health awareness and subjective norm, and on the other hand, perception of ease of use of apps was associated with self-efficacy related to health information provided by the internet.

Finally, sexual behaviors of college students and their willingness to use an app to prevent venereal diseases had been scrutinized by Richman, Webb, Brinkley, and Martin (2014). They applied an electronic survey to evaluate variables such as mobile technology use (e.g., the use of a mobile health app), attention in a health app alternative, current sexual behaviors, and demographics. Findings showed that students who were more active sexually and had more sexual partners were more likely to be attracted by an app that would help them improve their behaviors and avoid adverse health outcomes. Women, for example, would be most interested in period tracker and birth control reminder, while men worried about sexually transmissible diseases and unintended pregnancies.

A review of literature showed that the use of online surveys to study health interventions was quite prevalent. This study, too, used an online survey to collect data.

3.2 Data Collection and Procedures

3.2.1 Sample and Recruitment

The population of interest in the present study was college students, mainly undergraduate students in the US. The sample was recruited from a large undergraduate class conducted by the journalism department attended by students from all areas of study from a large western university in the US. All of the students were age 18 years and older.

As explained before, students, particularly undergraduate students, are characterized by their newly acquired independence from their parents' control and these children face challenges in their social relationship choices, academic and stress management, health-related habits, etc. in different aspects of their lives. For their transition to college life, students seek new friends who can be supportive and help them adapt to their new lives (Borsari & Carey, 2001). To keep their friends and new social circles, students might decide to align with group social norms and enact unhealthy behaviors like alcohol drinking and cigarette smoking cherished within groups and as part of studied developmental stages of young adults (Schulenberg & Maggs, 2002; Lange, Voas & Johnson, 2002; Borsari & Carey, 2001).

Moreover, some of them seem to be unaware of the consequences of their unhealthy choices now and in the future because they don't consider themselves as typical drinkers, smokers, etc. They don't realize these choices can have a harmful even irreversible impact on the quality of their health. As noted by Wechsler, Nelson & Weitzman (2000), the majority of the heaviest drinkers don't think they have a drinking problem and that they need help.

Other risky behaviors among college students such as cigarette smoking, can be categorized into two groups: daily and nondaily smokers (Sutfin et al., 2013). However, nondaily smokers that smoke cigarettes intermittently, for example, every weekend during parties, do not believe they are smokers who need health support to deal with the risks associated with smoking even episodic smoking.

Therefore, these risky and persisting behaviors can lead to more severe consequences that may necessitate a medical intervention (Eckert, 1989; Jessor & Jessor, 1977). If nothing is done in terms of behavior change through an innovative health intervention, there is a good chance that they may develop chronic diseases at some point in their lives.

Moreover, researchers usually rely on frames to contact future respondents. Some lists or frames that include contact information of individuals in a population can be used for recruitment purposes (Dillman, Smyth and Christian, 2014). Those lists make contact and recruitment more accessible for researchers. In the context of a university population, the collaboration with the administration to obtain a list of possible survey respondents is critical. The researcher in the present study got access to a digital list of college students from the university administration.

Among the undergraduate students who constituted the population of interest at the university, those who were taking a professional and technical communication class at a large western public university were targeted for recruitment in the study. The students enrolled in that communication class came from different academic departments and colleges. The diversity of academic fields, backgrounds, and ethnic groups made it more likely that these students were representative of the entire population of undergraduate students at the university.

The number of recruited participants was 224. A number that is much bigger than 74, the sample size as determined by G*Power 3.1.9.2 based on the multiple regression statistical test and

the relationship between 7 predictor variables and 1 criterion variable, and with 0.95 as the actual power which was very high. A summary of socio-demographic information about the study sample is provided in Table 1.

Table 1

Participant Characteristics (N=176)

	M (SD)	n (%)
Participant demographics		
Age	22 (4.06)	
Race:		
White		123 (70.3)
African American		7 (4.0)
Hispanic		12 (6.9)
Native American		1 (.6)
Asian		22 (12.6)
Mixed Race		6 (3.4)
Other		4 (2.3)
Gender:		
Male		75 (42.9)
Female		99 (56.6)
Other		1 (.6)
Relationship status:		
Married		5 (2.9)
Same partner for 1 year or longer		46 (26.3)
Same partner for 7-11 months		9 (5.1)
Same partner for 3-6 months		12 (6.9)
Same partner for less than three months		5 (2.9)
Not in a relationship		98 (56.0)
Use of health app:		
Yes		82 (46.6)
No		94 (53.4)

Note. N= sample size, M= mean, SD= Standard Deviation, n= number, %=percentage

3.2.2 Procedures

The data collection procedures for the survey was implemented in different steps to ensure a quality process and higher response rate. A key step was to get the Institutional Review Board's (IRB) approval of the pilot study. Then, the researcher sent amendments to the initial IRB approval that permitted pursuing the actual study. For that reason, documents such as survey questions (see

Appendix) were sent to IRB for its review. After obtaining the IRB approval, an email was sent to instructors of the professional and technical communication class to inform them of the survey and ask permission for their students' participation.

After informing the future participants, an invitation email with an incorporated link to the survey was sent to each participant invited for the survey. The survey began with the informed consent (per IRB policies), and if they agreed to participate, the next screens contained the survey questions. Once the online survey was completed, participants clicked a link to a separate online form for providing their names to ensure their survey responses remained anonymous, but their participation was recorded for receiving the extra credit incentive. The survey was voluntary, and participation was encouraged but not required so that non-participation would not be detrimental to any of the invited students.

Data were collected in February 2018 in a two week period with two reminders: one week after the invitation and one day before the survey closure.

3.3 Instruments and Operationalization

3.3.1 Instruments

Following the approval of the study by the Institutional Review Board (IRB) at Colorado State University, an online survey via Qualtrics was used to collect information that included introduction variables about overall use of health apps, quality of health in the past, present and future.

Also, variables regarding the perception of susceptibility to chronic diseases were measured using adapted Likert-type scales (e.g., 1=Strongly Disagree, 2= Disagree, 3= Neither disagree nor agree, 4= Agree, 5= Strongly Disagree) from previous studies. Likert (1932) initially developed a five-point scale (1= strongly approve, 2= approve, 3= Undecided, 4= disapprove 5=

strongly disapprove) as a quantitative method to measure attitudinal scales for the first time. Thus, Likert-type scales such as strongly disagree to agree strongly were considered to be variations of these original scales (Boone & Boone, 2012).

Also, Champion (1993), Holwerda (2000) and Abolfotouh et al. (2015) utilized a five-point Likert-type scale from strongly disagree (1) to strongly agree (5) for breast cancer screening, while Peterson et al. (1992) used the same scales to evaluate attitude toward a psychosocial variable like AIDS ethnocentrism (e.g., a belief that AIDS is not an African-American problem but for White gay community only) among gay African-American men.

The same Likert-type scales were used to assess all the variables related to the perceived susceptibility to chronic diseases, the severity of chronic diseases, benefits, barriers, cues to action, social influence, facilitating conditions, and intention to use a health management app.

Furthermore, demographic information such as age, gender, relationship status, and race was collected for statistical analysis purposes.

Cronbach's alpha was used to calculate the reliability for internal consistency within each construct measurement. According to Tavakol and Dennick (2011), Cronbach's alpha tended to be the most scientifically consistent measure of reliability. Most of the variables has alpha values of .70 or above with barriers (.48) and action cues (.64) being the only two exceptions (refer to Table 2). The researcher explored the idea of dropping a few items from the overall measure of these variables to see if it would increase the values. Analysis of the reliability scores showed that dropping items did not contribute to increasing the overall values.

Table 2

Results of Reliability Analysis

Factors	Cronbach's Alpha
Susceptibility	0.94
Lung cancer	0.81
High blood pressure	0.82
Type 2 diabetes	0.79
HIV/AIDS	0.91
Heart disease	0.88
Mental health disease	0.82
Seriousness	0.92
Lung cancer	0.85
High blood pressure	0.78
Type 2 diabetes	0.84
HIV/AIDS	0.91
Heart disease	0.87
Mental health disease	0.82
Benefits	0.88
Barriers	0.48
Action cues	0.64
Social influence	0.90
Facilitating conditions	0.87
Intention	0.95

3.3.2 Operationalization

A key construct in the theoretical framework is "diseases." By "diseases," the researcher meant one or more current chronic diseases that college students are likely to suffer from now and in the near future such as lung cancer, high blood pressure, Type 2 Diabetes, HIV/AIDS, heart disease and mental health problems such as anxiety and depression ("Chronic Disease Overview,"2017; "Undergraduate Students," 2015). These diseases are more frequent in the U.S. adult population, and college students are at risk of getting one or more of the diseases during their education at colleges and universities or shortly after graduation. If that situation happens now or in the future, it will have a negative outcome on their health and their overall quality of life.

The actual variables involved in the investigation of the hypotheses included one criterion variable and seven predictor variables which corresponded to five HBM elements (e.g., perceived

susceptibility, severity, benefits, barriers, cues to action) and two UTAUT 2 constructs (e.g., social influence and facilitating conditions). The remaining four UTAUT2 constructs (e.g., performance expectancy, effort expectancy, hedonic motivation, price) were used to describe an ideal future health management app.

The criterion variable was: intention to use the app which refers to an individual's plan to use. It was called the "Behavioral Intention" by Venkatesh, Thong, and Xu (2012). This variable was further measured by specific items to better catch its meaning in the context of the use of a mobile health app.

There are seven predictor variables: Perceived susceptibility to chronic diseases refers to the assessment of an individual's "personal risk" to a disease or health condition (DiClemente, Salazar & Crosby, 2013, p.32). Perceived seriousness of chronic diseases refers to a person's belief in the severity of a disease, and the sufferings it is likely to generate in the person's life (DiClemente, Salazar & Crosby, 2013, p.31). Perceived benefits can be defined as an individual's belief about the advantages related to a desired behavior to mitigate the risk of getting a disease (DiClemente, Salazar & Crosby, 2013, p.32). Perceived barriers which represent a person's assessment of "the obstacles" that can prevent him or her from enacting a recommended behavior to reduce a health risk. Cues to action can be defined as internal and external reminders of a reality that needs to be taken seriously (Melznera, Heinze & Fritscha, 2014). Social influence may be the degree to which an individual perceives that influential peers believe he or she should use a technology tool (Venkatesh, Morris, Davis & Davis, 2003). Finally, facilitating conditions refer to technology users' perception of the efforts by providers to ease the performance of the desired behavior (Venkatesh, Thong & Xu, 2012).

Furthermore, the criterion and predictor variables were measured by items adapted from prior research instruments investigating the same concepts. Susceptibility to lung cancer is a four-item measure that was adapted from Vassallo et al. (2009). The original measure used zero-order correlations to achieve discriminant validity among the constructs and ward off multicollinearity issues. The zero-order correlations were all significant under .85. The changes that were made to the original measure included lung cancer, family medical history, cigarette smoking habits and exposure instead of getting gut disorder/coronary heart disease. The items were also adapted from risk factors presented by the CDC website (2017). Here are the four items included in the survey.

- I feel that my chances of developing lung cancer in the future are high because I have a family history of lung cancer (e.g., siblings, parents, grandparents) (Vassallo, 2009; CDC, 2017).
- I feel that my chances of developing lung cancer in the future are high because I smoke cigarettes every day (Vassallo, 2009).
- I feel that my chances of developing lung cancer in the future are high because I smoke cigarettes occasionally (e.g., at parties) (Vassallo, 2009).
- I feel that my chances of developing lung cancer in the future are high because of my secondhand cigarette smoke exposure which makes it more likely that I will develop lung cancer (Vassallo, 2009; CDC, 2017)

Susceptibility to high blood pressure is a six-item measure that was adapted from Vassallo et al. (2009). The original measure used zero-order correlations to achieve discriminant validity among the constructs and ward off multicollinearity issues. The zero-order correlations were all significant under .85. The changes that were made to the original measure included high blood pressure, family medical history, obesity, level of sodium intake, drinking habit, cigarette smoking

habit, and lack of physical activity. The items were also adapted from risk factors presented by the CDC website (2014). Here are the six items included in the survey.

- I feel that my chances of developing high blood pressure in the future are high because I have a family history (e.g., siblings, parents, grandparents) of high blood pressure (Vassalo, 2009; CDC, 2014).
- I feel that my chances of developing high blood pressure in the future are high because I am obese (e.g., Body Mass Index (BMI) is 30 or more) (Vassalo, 2009; CDC, 2014).
- I feel that my chances of developing high blood pressure in the future are high because I eat too much sodium (e.g., table salt) (Vassalo, 2009; CDC, 2014).
- I feel that my chances of developing high blood pressure in the future are high because of my alcohol binge drinking habit (e.g., an average of 4 drinks or more during a single occasion) (Vassalo, 2009; CDC, 2014).
- I feel that my chances of developing high blood pressure in the future are high because I smoke cigarettes (Vassalo, 2009; CDC, 2014).
- I feel that my chances of developing high blood pressure in the future are high because of lack of physical activity (Vassalo, 2009; CDC, 2014).

Susceptibility to type II diabetes is a three-item measure that was adapted from Vassalo et al. (2009). The original measure used zero-order correlations to achieve discriminant validity among the constructs and ward off multicollinearity issues. The zero-order correlations were all significant under .85. The changes that were made to the original measure included high type II diabetes, family medical history, overweight issue, and lack of physical. The items were also adapted from risk factors presented by the CDC website (2017). Here are the three items included in the survey.

- I feel that my chances of developing Type 2 diabetes in the future are high because I have a family history of diabetes (e.g., siblings, parents, grandparents) (Vassalo, 2009; CDC, 2017).
- I feel that my chances of developing Type 2 diabetes in the future are high because I am overweight (e.g., Body Mass Index (BMI) is 25.0 to 29.9) (Vassalo, 2009; CDC, 2017).
- I feel that my chances of developing Type 2 diabetes in the future are high because of lack physical activity (e.g., walk 20 minutes every day) (Vassalo, 2009; CDC, 2017).

Susceptibility to HIV/AIDS is a three-item measure that was adapted from Vassalo et al. (2009). The original measure used zero-order correlations to achieve discriminant validity among the constructs and ward off multicollinearity issues. The zero-order correlations were all significant under .85. The changes that were made to the original measure included HIV/AIDS, unhealthy sexuality, and drug use. The items were also adapted from risk factors presented by the CDC website (2015 & 2017). Here are the three items included in the survey.

- I feel that my chances of developing HIV/AIDS in the future are high because of unsafe sex such as inconsistent use of protection (e.g., condoms) (Vassallo, 2009; CDC, 2017).
- I feel that my chances of developing HIV/AIDS in the future are high because I engage in sexual activity with multiple partners (Vassallo, 2009; CDC, 2017).
- I feel that my chances of developing HIV/AIDS in the future are high because of drugs (e.g., sharing needle or syringe) (Vassallo, 2009; CDC, 2015).

Susceptibility to heart disease is a six-item measure that was adapted from Vassalo et al. (2009). The original measure used zero-order correlations to achieve discriminant validity among the constructs and ward off multicollinearity issues. The zero-order correlations were all significant under .85. The changes that were made to the original measure included heart disease,

family medical history, lack of physical activity, high blood pressure, bad high cholesterol, cigarette smoking habit, and sedentary habit. The items were also adapted from risk factors presented by CDC website (2015). Here are the six items included in the survey.

- I feel that my chances of developing a heart disease like cardiovascular disease in the future are high because I have a family history (e.g., siblings, parents, grandparents) of heart disease (Vassallo, 2009; CDC, 2015).
- I feel that my chances of developing a heart disease like cardiovascular disease in the future are high because of my lack of physical activity (Vassallo, 2009; CDC, 2015).
- I feel that my chances of developing a heart disease like cardiovascular disease in the future are high because of high blood pressure (Vassallo, 2009; CDC, 2015).
- I feel that my chances of developing a heart disease like cardiovascular disease in the future are high because of bad high cholesterol (Vassallo, 2009; CDC, 2015).
- I feel that my chances of developing a heart disease like cardiovascular disease in the future are high because of my cigarette smoking habit (Vassallo, 2009; CDC, 2015).
- I feel that my chances of developing a heart disease like cardiovascular disease in the future are high because of my sedentary (e.g., sitting or being inactive for long hours) habit (Vassallo, 2009; CDC, 2015).

Susceptibility to mental health is a four-item measure that was adapted from Vassalo et al. (2009). The original measure used zero-order correlations to achieve discriminant validity among the constructs and ward off multicollinearity issues. The zero-order correlations were all significant under .85. The changes that were made to the original measure included mental problem, family medical history, insomnia, current stress, and traumatic events. Here are the four items included in the survey.

- I feel that my chances of developing a mental health problem like depression in the future are high because I have family history (e.g., siblings, parents, grandparents) of mental health problems (Vassallo, 2009).
- I feel that my chances of developing a mental health problem like depression in the future are high because of intense and prolonged insomnia (e.g., sleep less than 3 hours a day for 2 or more weeks, 3 or more consecutive days without any sleep) (Vassallo, 2009).
- I feel that my chances of developing a mental health problem like depression in the future are high because of my current stress due to whatever circumstances that appear unresolved to the point that I feel hopeless.
- I feel that my chances of developing a mental health problem like depression in the future are high because of traumatic events (e.g., witness events such as murder or loss of a loved one) (Vassallo, 2009).

Perceived seriousness of diseases is assessed by adapting items used by Vassallo et al. (2009) following the Health Belief Model to measure the likelihood someone can evaluate the seriousness of negative consequences of coronary disease (Strongly Disagree to Strongly Agree). As mentioned above, the authors achieved discriminant validity and eliminated multicollinearity issues among the constructs using zero-order correlations that were all significant under .85. Here are the twelve items measuring perceived seriousness to current chronic diseases such as lung cancer, high blood pressure, type II diabetes, HIV/AIDS, heart disease, and mental health included in the survey.

- If I develop lung cancer, it could lead to longstanding health problems.
- If I develop lung cancer, it would have a severe, negative influence on my quality of life.
- If I develop high blood pressure, it could lead to longstanding health problems.

- If I develop high blood pressure, it would have a severe, negative influence on my quality of life.
- If I develop Type 2 Diabetes, it could lead to longstanding health problems.
- If I develop Type 2 Diabetes, it would have a severe, negative influence on my quality of life.
- If I develop HIV/AIDS, it could lead to longstanding health problems.
- If I develop HIV/AIDS, it would have a severe, negative influence on my quality of life.
- If I develop a heart disease like cardiovascular disease, it could lead to longstanding health problems.
- If I develop a heart disease like cardiovascular disease, it would have a severe, negative influence on my quality of life.
- If I develop a mental health problem like depression, it could lead to longstanding health problems.
- If I develop a mental health problem like depression, it would have a severe, negative influence on my quality of life.

Perceived benefits is a four-item measure that was adapted from Kim, Ahn, and No (2012). The original measure has the minimum Cronbach's coefficient reliability of 0.80. The changes that were made to the original measure included replacing food and related descriptions with managing different aspects of health and prevention of chronic diseases. Here are the four items included in the survey.

- I believe that the app can be helpful to manage different aspects of my health.
- I believe that the app can help me prevent current chronic diseases.
- I believe that the app can help me make healthy choices.

- I believe that the app can be important for my health.

Perceived barriers is a four-item measure that was adapted from Kim, Ahn, and No (2012). The original measure had the minimum Cronbach's coefficient reliability of 0.83. The changes that were made to the original measure included trivial thing, no privacy, and disease is destiny instead of food and related descriptions. Here are the four items included in the survey.

- Using the app is a trivial (which means not important) thing.
- I have no privacy using the app.
- Using the app takes time.
- In my opinion, a chronic disease is destiny, and the app will not change it.

Cues to Action is a four-item measure that was adapted from Aspinwall et al. (1991). The original measure had the minimum Cronbach's coefficient reliability of 0.82. The changes that were made to the original measure included those who suffer from one or more of the diseases, who died of one or more of the diseases, had symptoms, and had seen or heard information. Here are the four items included in the survey.

- I have a family member or someone very close to me who suffers from one or more of the diseases mentioned.
- I had a family member or someone very close to me who died of one or more of the diseases mentioned.
- I have had symptoms that suggest I could develop one or more of the chronic diseases mentioned.
- I have seen or heard information related to one or more of the chronic diseases mentioned.

Information avoidance, that is considered a noticeable pattern of a human behavior as it relates to avoiding unwanted information about possible negative health consequences, was included in the

measurement along with the other main variables adapted from the HBM and the UTAUT 2. Information avoidance is a three-item measure that was adapted from Taber et al. (2015) with cronbach's alphas that indicated .83 for the two firsts items: avoidance and ignorance, and from Miles, Voorwinden, Chapman, and Wardle's (2008) study, with the last item which is prefer not to, that displayed .86 as a cronbach's alpha.

- I would avoid learning everything about my health.
- When it comes to my health, sometimes ignorance is bliss (which means when you do not know about something, you do not worry about it)
- I prefer not to think of chronic diseases.

Social Influence is a four-item measure that was adapted from Venkatesh, Thong, and Xu (2012). The original measure that used the internal consistency reliabilities (ICRs) of multi-item scales modeled with reflective indicators was .75 or more. The three initial items were kept and light changes were made by replacing mobile internet with the app. Here are the three items included in the survey.

- People whose opinions that I value would like for me to use the app.
- People who are important to me think that I should use an app.
- People who influence my behavior think that I should use the app.

Facilitating conditions are a four-item measure that was adapted from Venkatesh, Thong, and Xu (2012). The original measure that used the internal consistency reliabilities (ICRs) of multi-item scales modeled with reflective indicators was .75 or more. The changes that were made to the original measure included rewording items and adding the item: control over the app. Here are the four items included in the survey.

- The app is compatible with my mobile device or smartphone.

- I know how to use the app.
- Using the app is entirely under my control.
- Technical assistance is available for the app users when needed.

Intention to use the app is a four-item measure that was adapted from Cho, Quinlan, Park, and Noh (2014). The original measure had the minimum Cronbach's coefficient reliability of 0.95. The changes that were made to the original measure included download, activate, and try the app. Here are the four items included in the survey.

- I intend to download the app to manage different aspects of my health.
- I intend to activate the app to manage different aspects of my health.
- I intend to try the app to manage different aspects of my health.
- I intend to frequently use the app to manage different aspects of my health.

Demographic information is a four-item measure.

- Age
- Gender
- Relationship status
- Race/ethnicity

Table 3

The Variables and Sources Used in the Survey Instrument	
Variables	Sources
Criterion variable: Intention to use the app	Cho, Quinlan, Park, and Noh (2014)
Predictor variables:	
Perceived susceptibility to diseases	Vassallo et al. (2009), CDC (2016) (2014) (2017) (2015)
Perceived severity of diseases	Vassallo et al. (2009)
Perceived benefits	Kim, Ahn, and No (2012)
Perceived barriers	Kim, Ahn, and No (2012)
Cues to action	Aspinwall et al. (1991)
Social influence	Venkatesh, Thong, and Xu (2012)
Facilitating conditions	Venkatesh, Thong, and Xu (2012)

3.4 Validity and Reliability Testing: Pilot study

In addition to the use of Cronbach's alpha for testing the reliability related to internal consistency to measure relatedness between items in each construct, a pilot test was planned before the actual administration of the survey questions.

The pilot test, with feedback questions on the survey, took place during the fall semester 2017 and was intended to improve the instrument and the overall quality of the study. Thus, the pilot test helped to identify potential problems and provided an opportunity that allowed to making appropriate changes in the instrument for the primary study. For example, the Likert type scale Strongly Disagree (1) to Strongly Agree (5) replaced Strongly Agree (1) to Strongly Disagree (5). That scale order was preferred because it shows the increase of values and makes it easy to interpret measured variables from a very low to a very high perception.

Also, constructs such as benefits and barriers related to the Health Belief Model, plus facilitating conditions of the extended Unified Theory of Acceptance and Use of Technology were added to the actual thesis to fully use the potential predictive power of both theories in the theoretical framework. With a better analysis of those constructs in various studies about health beliefs and behaviors change on the one hand, and new technology or mobile health applications acceptance on the other hand, their relevance in the present study became obvious.

Furthermore, the opened-ended question about other features and characteristics that respondents would like to see in the future app were not used in the final study. Respondents' chief preferences such as ease of use, reminder, and accuracy were emphasized in the description of an ideal health app.

Finally, even though there wasn't an order effect between order 1 and order 2 in the pilot test, the former was preferred in the actual study. It grouped response items for susceptibility and seriousness of a single chronic disease together instead of separating them in susceptibility to chronic diseases on the one hand, and seriousness of chronic diseases on the other side.

CHAPTER 4. RESULTS AND DISCUSSION

4.1 Results

A descriptive analysis of SPSS Statistics 24 was used to summarize the respondents' characteristics. A total of 178 college students ($178/224 = 79\%$) responded to the online questionnaire. 176 students ($176/178 = 98\%$) fully completed the survey.

The model variables that include perceived susceptibility to diseases, perceived seriousness of diseases, perceived benefits of the app, perceived barriers to the app, cues to action, social influence, facilitating conditions and intention to use the app were also prepared for the inferential analysis: multiple linear regression. Each variable was measured on a 5-point Likert scale ranging from 1 to 5. The values in the scale were added up and divided by the number of value options ($1+2+3+4+5 = 15/5=3$). The value of 3 represented a point on the scale where the respondent has a neutral perception of the construct represented by the variable, and 5 corresponded to a very strong or high perception. Thus, the average score of < 3 of a variable corresponded to a low perception, the average score $= 3$ was a neutral perception, and the average score of >3 represented a high perception.

See Table 4 that comparatively displays the mean scores (that ranged from $M = 2.063$ to 3.922 , $SD = 0.510$ to 0.910) of the model variables with high perceptions of intention to use the app, seriousness of chronic diseases, benefits of the app, actions cues, social influence, and facilitating conditions along with low perceptions of susceptibility to chronic diseases, barriers to the app and social influence.

Furthermore, as discussed earlier information avoidance, that might be a confounding variable which could provide an explanation of why participants were not interested in health

programs because of fear of unwanted health outcomes, was tested along with the other predictor variables. Thus, the researcher wanted to make sure that that factor was eliminated as a probable confounding variable. The result showed information avoidance displayed a low perception (M= 2.12, SD= 0.758), and it did not have a significant influence (standardized $\beta = -.078$, $p < .143$) on intention to use an app in the regression model .

Table 4

Means, Standard Deviations, and Intercorrelations for Intention to Use the App and Predictor Variables (N= 176)

	M	SD	Susceptibility	Seriousness	Action cues	Benefits	Barriers	Social influence	Facilitating condition
Intention to Use	3.16	0.91	.13*	-0.12	-0.03	0.63**	-0.39**	0.53**	0.57**
Predictor variables									
Susceptibility	2.06	0.73	--	0.19**	0.27**	-0.02	0.08	0.13*	0.06
Seriousness	3.92	0.51		--	0.25**	0.00	-0.00	-0.10	-0.03
Action cues	3.30	0.82			--	-0.02	0.03	0.01	0.10
Benefits	3.67					--	-0.29**	0.40**	0.49**
Barriers	2.83	0.58					--	-0.08	-0.09
Social influence	2.99	0.90						--	0.42**
Facilitating conditions	3.77	0.66							--

* $p < .05$; ** $p < .01$.

To test the posited hypotheses, the researcher conducted a multiple linear regression by using SPSS Statistics 24. The combination of variables to predict intention to use the app from susceptibility to chronic diseases, seriousness of chronic diseases, benefits, barriers, actions cues, social influence, and facilitating conditions was statistically significant, $F(7, 168) = 39.448$, $p < .001$ with $R^2 .61$. That meant that 61 % of the variance was explained by the predictor variables in the model. That result indicated that overall the regression model statistically and significantly

predicted the outcome variable. It was a good fit for the data. When considered separately, the variance test for the HBM variables: susceptibility, severity, benefits, barriers and actions cues showed a slightly statistically significant higher value $F(5, 170) = 32.605, p < .000$ with $R^2 .47$ (47%) than the UTAUT 2 variables that included social influence and facilitating conditions with $F(2, 173) = 64.547, p < .000$ with $R^2 .42$ (42%).

Also, the regression model was used to find the influences of susceptibility to chronic diseases, seriousness of chronic diseases, benefits, barriers, actions cues, social influence, and facilitating conditions on the intention to use the app. This study took these seven factors as independent variables and intention to use the app as the dependent variable in the regression model. Table 4 shows the intercorrelations between variables, and Table 5 presents the results of the regression analysis. The following paragraphs show the results of the study hypotheses.

In the present regression model, the regression assumption of homoscedasticity, linearity, normality, independence of residuals, and the absence of multicollinearity are all satisfied. The following paragraphs show the results of the study hypotheses.

The results supported the hypotheses that *H1: susceptibility to chronic diseases* (standardized $\beta = .145, p < .005$), *H3: benefits* (standardized $\beta = .319, p < .000$), *H4: barriers* (standardized $\beta = -.264, p < .000$), *H6: social influence* (standardized $\beta = .228, p < .000$) and *H7: facilitating conditions* (standardized $\beta = .291, p < .000$) were positively and negatively (*H4: barriers*) associated with intention to use the app. However, the hypotheses that *H2: seriousness of chronic diseases* (standardized $\beta = -.098, p < .053$), and *H5: cues to action* (standardized $\beta = -.062, p < .226$) were negatively associated with intention to use the app but were not supported by the results of our study. Therefore, whereas H1, H3, H4, H6, and H7 were fully supported, H2 and H5 were rejected.

Table 5

Multiple Linear Regression Analysis Summary for Susceptibility, Seriousness, Benefits, Barriers, Social Influence, and Facilitating Conditions Predicting Intention to Use the app (N=176)

Variable	<i>B</i>	<i>SE B</i>	B	<i>T</i>	<i>P</i>
Susceptibility	.182	.063	.145	2.875	.005
Seriousness	-.174	.089	-.098	-1.951	.053
Benefits	.379	.070	.319	5.441	.000
Barriers	-.411	.078	-.264	-5.229	.000
Action cues	-.069	.056	-.062	-1.215	.226
Social influence	.231	.055	.228	4.161	.000
Facilitating conditions	.403	.079	.291	5.077	.000
Constant	1.260	.517			

Note. $R^2 = .61$; $F(7, 168) = 39.448$, $p < .001$.

4.2. Discussion

This study aimed at understanding the factors that might influence college students' intention of using an app to manage critical aspects of their health and avoid chronic diseases. The results showed some factors in the combined model of the HBM and UTAUT2 had significant influence on intention to use the future health management app. Thus, the data obtained from the survey presented the results whether or not they supported the hypotheses.

As expected, perceived susceptibility to chronic diseases did positively predict respondents' intention to use the app. Higher perceived susceptibility to current chronic diseases can increase awareness of those diseases and raise college students' intention to use the app to manage different aspects of their health. This finding supports a previous study in which, among other predictor variables, perceived susceptibility significantly predicted college students' alcohol use and abuse (Champion, 2012). Also, though not statistically significant, perceived susceptibility to breast cancer, for example, was positively correlated with breast self-examination (BSE) in nurses at a community hospital (Holwerda, 2000). Another study about intention to do BSE by Savage and Clarke (1996), revealed that a relationship exists between susceptibility to

breast cancer and the above outcome variable. Health promoters might use this information in designing campaigns and interventions. The assessment of college students' susceptibility to one or more chronic diseases is a critical step in designing health interventions. Also, health messages should emphasize on college students' vulnerability to chronic diseases. This strategy will increase awareness and readiness in at-risk individuals who will probably enact protective actions like using mobile health technology to manage different aspects their health.

Perceived seriousness of chronic diseases did not play a significant enough role to affect college students' intention to use a health management app. Higher perceived seriousness of current chronic diseases did not necessarily increase college students' willingness to use the app. Also, the seriousness of the negative consequences of chronic diseases on health, and quality of life seem not to be a decisive factor in college students' intention to enact or not a protective action against those diseases like using a health app to manage health. According to existing literature, communicating about the severity of diseases without self-efficacy may trigger fear, defensive responses and denial instead of behavior change in individuals (Peters, Ruiter & Kok, 2014). In the literature, perceived seriousness seems to be a complex construct in applying the Health Belief Model (HBM). According to Vermandere et al. (2016), severity or seriousness of a disease was regularly associated with a non-significant prediction of preventive health behaviors as revealed in important studies. This reality was pointed out by Sun, Wang, Guo, and Peng (2013) who were studying severity of health problems as a predictor variable of technology acceptance. The authors found that the former had little effect on the latter. Another research executed by Kim, Ahn, and No (2012), discovered that severity of a disease compared with other predictor variables did not have a significant influence on college students' intention of eating healthy food. They did not perceive a threat of chronic diseases related to unhealthy eating. This finding is a hint for health

educators in the sense that insisting on the threat chronic diseases might represent for college students can lead to limited success. Thus, communicating too much about negative health outcomes of unhealthy behaviors by using fear-based messages at the expense of other factors such as benefits, barriers, facilitating conditions etc. can be ineffective in changing college students' unhealthy behaviors.

Benefits of the app did show a positive influence on using the future health app. More anticipated benefits of the app can increase college students' willingness to give the app a try to manage different aspects of their health and avoid chronic diseases. Awareness of the existence of this kind of app with real and relevant advantages might motivate college students to adopt it. The perceived benefits of the desired health behavior were noticed in prior studies. Didarloo, Nabilou, and Khalkhali (2017) made it evident that the relationship between foreseen benefits and breast self-examination was statistically significant among female students in an Iranian university. Also, a considerable impact of the benefit from eating healthy food intentionally for better choices of healthy eating and physical activity was observed among college students in Korea (Kim, Ahn & No, 2012). College students were likely to change their unhealthy eating behaviors when anticipated benefits of eating healthy foods were significantly higher while barriers were lower. This information can be used by health promoters to emphasize on the benefits of healthy behaviors so that college students clearly see health gains for improving their behaviors. It is a health message strategy that is possible by using gain-framed messages which can trigger positive reaction and motivate to take action.

As presumed, barriers to the health management app negatively affected college students' intention. Less perceived barriers can encourage college students to use the app. In this study, college students weighed more benefits than barriers (see means in Table 4) regarding the adoption

of the app. This result related to barriers was consistent with prior studies. McArthur et al. (2017) found that perceived barriers and body mass index (BMI) had a statistically significant association in college students. Holwerda (2000), analyzing the possible obstacles to the frequency of BSE among nurses, showed a significant negative association between the predictor and outcome variables. The level of barriers determined the frequency of BSE. Thus, a higher level of barriers could prevent the nurses from enacting BSE. This finding is an important information for health educators. They need to thoroughly analyse and eliminate different types of obstacles that might hinder the adoption of mobile health technology by a target audience like college students.

Contrary to what was assumed, cues to action did not accord with the original posited hypothesis. More action cues do not significantly influence intention to use the app. Internal (e.g., symptoms) and external (e.g., deaths due to chronic diseases, news) cues might not be sufficient to trigger protective actions like adopting an app to manage different aspects of health. Previous studies also demonstrated that internal or external cues to actions did not necessarily create a significant association with an outcome variable. That was the case in a study related to condom use among women in Ghana, where cues such as knowledge of anyone who has AIDS or died because of that disease did not significantly influence condom use (Baiden & Rajulton, 2011). That belief from women was indicative of the ideas that individuals could not be infected with HIV/AIDS as long as they had sex only with persons they believed were serious partners. This information might be a lesson for health promoters. Internal and external cues to actions seem not to be a decisive factor for behavior change as long as college students are not aware of their vulnerability to chronic diseases and the availability of health solutions via their mobile phones.

As looked for, social influence was associated with intention to use the health app. Higher social influence is likely to increase the intention to use the mobile health solution. Thus, among

various factors college students seem to rely on important individuals in their social environment to talk about and recommend the use of a health app. This finding is consistent with a prior study by Sun, Wang, Guo, and Peng (2013), who predicted technology acceptance through the influence of important others. Contrary to technology acceptance in medical professionals who very often rated social influence or subjective norm low in their decision to adopt new technology, individuals significantly relied on other people's opinions to help them use one.

Finally, facilitating conditions positively predicted intention to use the health management app. Higher quality of facilitating conditions or services related to the app operation seems to be a contributing factor that increases college students' likelihood to adopt it. They might view supporting services related to the use of an app as crucial. The finding is consistent with other studies in technology acceptance. Venkatesh et al. (2012) concluded that facilitating conditions mostly impacted intention to adopt mobile internet. Peng, Kanthawala, Yuan, and Hussain (2016), in a qualitative study, discovered factors such as low awareness of health app, lack of app literacy, costs, etc. if not thoroughly considered could create unfavorable conditions for a health app acceptance among young adults.

The impact of five out of seven predictor variables on intention to use the app is consistent with a prior study by Miller, Chandler, and Mouttapa (2015). These authors found no significant differences between gender and racial groups on mobile devices and app use consistent with results the researcher found in the present study. Most importantly, they unfolded the increasing college students' willingness to adopt a health app promoted by their university.

The study results also aligned with research conducted by Dennison et al. (2013), who discovered that more and more young healthy people showed a readiness to use apps that facilitate healthier behaviors. Gowin, Cheney, Gwin, and Wann (2015), for example, encouraged health

promoters who target college students for change in their health habits to take advantage of their noticeable adoption of new technologies to initiate health interventions using these novel platforms.

In addition to the socio-demographic characteristics that did not influence the strong patterns of the results, a variable like information avoidance that is not unfamiliar in the literature in assessing attitude toward chronic diseases was incorporated in the model. It showed no effect on the criterion variable despite the fact that it was negatively correlated with it. The objective of these additional steps in the data analysis was to make sure there were not any confounding variables and to eliminate them as much as possible.

There are some limitations though the present study presented some promising results in the way college students perceived health threats such as current chronic diseases, and about their intention to use a future health management app.

The nature of the study, an online and self-administered survey can generate some biases due to the absence of a direct observation of respondents' actual attitudes and behaviors, a measure of trustworthiness in respondents' answers, and a generalizability because of a convenience sampling. Therefore, the biases are identified as follows.

First, the study was cross-sectional. That means the data were collected at a single point in time. Thus, it is challenging to measure the real effects of predictor variables on the criterion variable of interest. The researcher can only establish a relationship, not a causality, between those variables under a single survey that took two weeks for completion.

Second, some people are eager to agree or disagree regardless of the meaning of survey questions and their real thoughts. That negligence on their part might create a response bias the

same as a bias related to social desirability, in which respondents guess answers that the researcher can desire to support or not about some hypotheses.

Third, this study did not analyse if there was an interaction effect of the independent variables on the dependent variables. Given the complexity of the health models studied, it is important to consider if there are interaction effects and this researcher suggests that future studies consider such analyses to provide a more clear picture of the different determinants that affect whether or not a college students decided to adopt an health app to help them prevent chronic diseases.

Finally, the results of the present study cannot be generalized to the entire college student population as the sample was a convenience one despite a relative representation of White, Black, Hispanic, Asian and Native Americans ethnic groups (see Table 1). Also, generalizability of this study is tenous because demographic representation is more complex than just race.

CHAPTER 5. CONCLUSION

Millions of people die from the negative consequences of avoidable chronic diseases every year (World Health Organization, 2005). Morbidity and mortality due to severe diseases such as lung cancer, high blood pressure, type II diabetes, HIV/AIDS, heart disease and mental health disease are very often linked to unhealthy behaviors and lifestyles that people might develop at an earlier stage in life like during college life (Lozano et al., 2012; CDC, 2017). Many young people on campuses, because of their newly acquired independence from parental control, are vulnerable to health-related challenges and questionable choices that increase their likelihood to develop those diseases now or shortly.

At the same time, college students are significant users of mobile devices like smartphones connected to the internet. They represent engaged adopters of smartphones for many purposes, of which health-related information seeking and mobile fitness and health apps are becoming more and more popular. Mobile phones owned by college students can be appropriate channels to reach out to them to promote health and prevent diseases. Thus, mobile health technology might be an excellent way to engage students in preserving their health.

However, a critical step in supporting students' health would be to understand their beliefs and attitudes toward chronic diseases. That is why a perception assessment of the reality of chronic diseases regarding personal vulnerability and severity, cues to action, benefits, barriers, social influence and facilitating conditions seems judicial to see perceived levels and the extent to which they can influence intention to use a health management app. This study aimed at understanding the intention to use a future health app based on the perception of the above factors.

The theoretical model that was developed to investigate college students' perception of chronic diseases and likelihood to adopt a future app to manage different aspects of their health and avoid those diseases, included the Health Belief Model (HBM) and the extended Unified Theory of Acceptance and Use of Technology (UTAUT2). They are a combination of typical theories in respectively gauging health beliefs and new technology acceptance to predict the adoption of a health solution adapted to college students' life.

The theoretical model was used as an assessment tool of the levels (e.g., high or low) of perception of all eight variables that were included in the study. The cut off for the means related to the perception of those variables was 3. Thus, mean < 3 equals to low perception, and mean > 3 corresponds to high perception. Apart from the measurement of social influence (M= 2.989) that was a low perception and of a little surprise compared to the result of the pilot study in which it was considered high, the other variables showed unsurprising means. For example, the average perception of benefits (M= 3.670) of the future health app outweighs that of barriers' (M=2.834).

The model also allowed for the analysis of the potential effects of predictor variables on the criterion variable of interest. Data obtained through the online survey showed that predictor variables such as perceived susceptibility, benefits, barriers, social influence and facilitating conditions played significant and meaningful roles in influencing the intention to use the future health app.

Findings from this research have various implications for health science researchers and promoters. The theoretical model that combines the HBM and UTAUT2 seems promising to investigate current beliefs about chronic diseases and predict interest in adopting a recommended health behavior or solution to prevent them from happening. Public health battle is multifaceted,

and health science has a significant role to play in identifying innovative theoretical frameworks that can advance health practices.

The other implication of the present study is for health app developers and promoters in colleges and universities. For app developers, there are some lessons they can draw from the findings in the present research. App developers need to conduct a theory-based mobile health research to assess, understand college students' unhealthy behaviors and willingness to take actions. The theoretical framework which is a combination of the HBM and UTAUT2 in the present study can be explored. The framework showed some positive premises to investigate the perception of one or more chronic diseases. Thus, depending on the levels of perception of the variables of interest, app developers may adapt health messages and communication strategies. In addition to the theoretical background that is necessary to design an health app, app developers are advised to create an app that is accessible, safe and functional. Access to a promising health app is key for college students to be able to use it. The app must not only be free for college students but also have an excellent customer service to increase adoption. Safety refers to a mobile health solution that is not harmful for users' confidentiality, privacy, physical and emotional health. The app will become popular among college students if it helps them solve specific problems. The app should be functional and effective in dealing with specific health threats. This is why, it is important to increase the app usability to reach its full functionality. College students insisted on the expectancy efforts to operate an app that should not be burdensome for their already busy life.

Also, the findings of the present study can inform health app promoters. They might increase college students' engagement in preventive health programs. For example, it is important to convince and network with colleges and universities to use the health management app product. Then, the universities in partnership with the app promoters will create facilitating conditions

following, for example, the social marketing strategy. It encompasses marketing mix strategies which are the 4 Ps: the product, price, place and promotion (Lee & Kotler, 2015). The product, in the present case, is the health management app that should comparatively be a better one with essential and preferred features for its easy operation by college students. The price should be accessible and preferably free for college students in a business partnership between the app promoters and colleges and universities. The place, where the app can be found and downloaded, is the universities' digital platforms such as websites or canvas or the app promoter's website to keep exclusivity in the business partnership. The promotion is another key aspect of the marketing mix. The health app promoters and universities will conjugate efforts to craft messages that show credibility and sponsorship of the app by universities the same as the benefits and other factors discussed earlier. The credibility will also be achieved if the app and related customer services are professional and effective as described and expected by users. The promoters should not neglect creative elements in the use of the app to create more engagement and excitement based on findings like selling the benefits of using the app, the participation of important others (e.g., parents or friends) in motivating the users, the quality of facilitating conditions such as effective customer services and a direct communication with health professionals on the platforms. Thus, not only users and future users can communicate with health professionals involved in the app but are aware of the existence of the app through channels such as printed media, social events, social media, text messaging, Word-of-mouth marketing (WOMM), etc. in their physical and digital environments.

Finally, the engagement can result from a realistic and comprehensive emphasis on constructs such as benefits, facilitating conditions, social influence, and barriers which were respectively the most highly correlated (see Table 4) with intention to use a health management

app. Barriers, on the other hand, as they are one of the key factors that determine future use of a health app, should be drastically reduced concerning costs and efforts to increase access and use.

Future directions are provided to build upon the findings in the present study. To our knowledge, it is the first time a study simultaneously looks at current chronic diseases perception among college students and their intention to use a health management app. The study is exploratory in the sense that it used a novel theoretical framework that included the Health Belief Model and the extended Unified Theory of Acceptance and Use of Technology. The model helped in assessing chronic diseases perception and intent to use new technology like a health app to prevent them from happening in individuals.

Suggestions for future research include the refinement of the questionnaire items that will all show a reliable internal consistency with a Cronbach's alpha of .70 at a minimum. Despite using adapted scales from prior studies, a survey instrument that was pretested, a pilot testing, and dropping items in order to find internal consistency, variables such as action cues (α .64) and barriers (α .48) still presented low Cronbach's alphas.

Another recommendation for optimal measurement of perception of chronic disease will be to target college students who have specific problematic lifestyles and unhealthy behaviors (e.g., cigarette smokers, binge drinkers, regular fast food eaters or college students with multiple sexual partners, etc.). These groups that are highly vulnerable to one more chronic diseases can better take advantage of the present theoretical model and preventive actions like adopting a health app.

Also, further studies could narrow the scope of the chronic diseases to only one at a time to better focus and get answers related to specific behaviors. This highly targeted recruitment, instead of the convenience sampling of the present study in which some respondents might not

feel personally concerned with the social determinants of the described chronic diseases, can generate better behavior assessment and change decisions, and intention to use a health management app.

Finally, given the interest of college students in adopting the future app that will help them manage different aspects of their health, key follow-up steps are planned to complete the development of the app having in mind the main findings in the present study and other available resources. Further research, like a focus group, a pilot test or a randomized controlled trial focusing on the usability and measurable health outcomes, could help to finalize the mobile health technology before its promotion and implementation in colleges and universities to support college students' health.

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APPENDIX

Survey questionnaire

The following questions are related to your opinions and experiences to current chronic diseases and health apps. Please tick the answer that best describes your feelings about each statement.

There are no right or wrong answers. Some key terms in *italics* are defined to ease comprehension. At the end of the survey, you will be directed to a separate link to write your name and email to get the 5 points extra credits. Thank you in advance for your help!

Note. 1= Strongly Disagree (SD), 2= Disagree (D), 3= Neutral (N), 4= Agree (A), 5= Strongly Agree (SA)

1. Please note, your response to this question will not affect your ability to take the entire survey.

Do you currently use any apps to monitor or manage your health? (e.g., fitness trackers, food logs, mood/mental health guidance apps, etc.)

Yes

No

2. Overall, what do you think the quality of your health was in the past?

Excellent

Very good

Good

Fair

Poor

3. Overall, what do you think the quality of your health is now?

Excellent

Very good

Good

Fair

Poor

4. Overall, what do you think the quality of your health will be in the future?

Excellent

Very good

Good

Fair

Poor

Lung cancer, high blood pressure, type 2 diabetes, HIV/AIDS, heart disease, mental health illnesses are examples of current chronic diseases. Please rate your level of agreement/disagreement with each of the following statements.

	SD	D	N	A	SA
5. I know about chronic diseases such as lung cancer, high blood pressure, Type 2 diabetes, HIV/AIDS, heart disease and mental health illnesses.	1	2	3	4	5
6. I know about the causes of chronic diseases such as lung cancer, high blood pressure, Type 2 diabetes, HIV/AIDS, heart disease and mental health illnesses.	1	2	3	4	5
7. I know about the consequences of chronic diseases such as lung cancer, high blood pressure, Type 2 diabetes, HIV/AIDS, heart disease and mental health illnesses.	1	2	3	4	5

Secondhand cigarette smoke exposure refers to when a parent or friend frequently smokes cigarettes in your presence. Please rate your level of agreement/disagreement with each of the following statements related to lung cancer and select the answer that best describes your feelings.

	SD	D	N	A	SA
8. I feel that my chances of developing lung cancer in the future are high because I have a family history of lung cancer (e.g., siblings, parents, grandparents).	1	2	3	4	5
9. I feel that my chances of developing lung cancer in the future are high because I smoke cigarettes everyday.	1	2	3	4	5
10. I feel that my chances of developing lung cancer in the future are high because I smoke					

cigarettes occasionally (e.g., at parties). 1 2 3 4 5

11. I feel that my chances of developing lung cancer in the future are high because of my secondhand cigarette smoke exposure that makes it more likely I will develop lung cancer. 1 2 3 4 5

Longstanding health problems refer to health issues established in an individual for a long time. Quality of life refers to an individual's general well-being in society. Please rate your level of agreement/disagreement with each of the following statements related to lung cancer and select the answer that best describes your feelings.

- | | SD | D | N | A | SA |
|--|----|---|---|---|----|
| 12. If I develop lung cancer, it could lead to longstanding health problems. | 1 | 2 | 3 | 4 | 5 |
| 13. If I develop lung cancer, it would have a severe and negative influence on my quality of life. | 1 | 2 | 3 | 4 | 5 |

Alcohol binge drinking occurs after 4 drinks for women and 5 drinks for men during a single occasion. Please rate your level of agreement/disagreement with each of the following statements related to high blood pressure and select the answer that best describes your feelings.

- | | SD | D | N | A | SA |
|---|----|---|---|---|----|
| 14. I feel that my chances of developing high blood pressure in the future are high because I have a family history (e.g., siblings, parents, grandparents) of high blood pressure. | 1 | 2 | 3 | 4 | 5 |
| 15. I feel that my chances of developing high blood pressure in the future are high because I am obese (e.g., Body Mass Index (BMI) is 30 or more). | 1 | 2 | 3 | 4 | 5 |
| 16. I feel that my chances of developing high blood pressure in the future are high because I eat too much sodium (e.g., table salt). | 1 | 2 | 3 | 4 | 5 |

17. I feel that my chances of developing high blood pressure in the future are high because of my alcohol binge drinking habit (e.g., an average of 4 drinks or more during a single occasion). 1 2 3 4 5
18. I feel that my chances of developing high blood pressure in the future are high because I smoke cigarettes. 1 2 3 4 5
19. I feel that my chances of developing high blood pressure in the future are high because of my lack of physical activity. 1 2 3 4 5

Longstanding health problems refer to health issues established in an individual for a long time. Quality of life refers to an individual's general well-being in society. Please rate your level of agreement/disagreement with each of the following statements related to high blood pressure and select the answer that best describes your feelings.

- | | SD | D | N | A | SA |
|--|----|---|---|---|----|
| 20. If I develop high blood pressure, it could lead to longstanding health problems. | 1 | 2 | 3 | 4 | 5 |
| 21. If I develop high blood pressure, it would have a severe and negative influence on my quality of life. | 1 | 2 | 3 | 4 | 5 |

Type 2 diabetes refers to the type of diabetes acquired through unhealthy eating and drinking as compared to Type 1 diabetes that is genetic or hereditary. Please rate your level of agreement/disagreement with each of the following statements related to Type 2 diabetes and select the answer that best describes your feelings.

- | | SD | D | N | A | SA |
|---|----|---|---|---|----|
| 22. I feel that my chances of developing Type 2 diabetes in the future are high because I have a family history of diabetes (e.g., siblings, parents, grandparents) | 1 | 2 | 3 | 4 | 5 |
| 23. I feel that my chances of developing Type 2 diabetes in the future are high | | | | | |

because I am overweight (e.g., Body Mass Index (BMI) is 25.0 to 29.9). 1 2 3 4 5

24. I feel that my chances of developing Type 2 diabetes in the future are high because of lack physical activity (e.g., walk 20 minutes every day). 1 2 3 4 5

Longstanding health problems refer to health issues established in an individual for a long time. Quality of life refers to an individual's general well-being in society. Please rate your level of agreement/disagreement with each of the following statements related to Type 2 diabetes and select the answer that best describes your feelings.

	SD	D	N	A	SA
25. If I develop Type 2 Diabetes, it could lead to longstanding health problems.	1	2	3	4	5

26. If I develop Type 2 Diabetes, it would have a severe and negative influence on my quality of life.	1	2	3	4	5
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An individual can develop HIV/AIDS through ways such as unsafe sex, drugs injections, and unsafe medical tools or services in hospitals. Please rate your level of agreement/disagreement with each of the following statements related to HIV/AIDS and select the answer that best describes your feelings.

	SD	D	N	A	SA
27. I feel that my chances of developing HIV/AIDS disease in the future are high because of unsafe sex such as inconsistent use of protection (e.g., condoms).	1	2	3	4	5

28. I feel that my chances of developing HIV/AIDS in the future are high because I engage in sexual activity with multiple partners.	1	2	3	4	5
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29. I feel that my chances of developing HIV/AIDS disease in the future are high because of drugs (e.g., sharing needle or syringe).	1	2	3	4	5
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Longstanding health problems refer to health issues established in an individual for a long time. Quality of life refers to an individual's general well-being in society. Please rate your level of agreement/disagreement with each of the following statements related to HIV/AIDS and select the answer that best describes your feelings.

- | | SD | D | N | A | SA |
|---|----|---|---|---|----|
| 30. If I develop HIV/AIDS, it could lead to longstanding health problems. | 1 | 2 | 3 | 4 | 5 |
| 31. If I develop HIV/AIDS, it would have a severe and negative influence on my quality of life. | 1 | 2 | 3 | 4 | 5 |

Family history of a disease is the presence of the disease in individuals in the family through genetics. Physical activity refers to biking or jogging etc. Sedentary habit refers to sitting or being inactive for long hours. Cholesterol is a type of fat found in your blood. There are good and bad cholesterol. The latter is due to genes or factors such as unhealthy diet and lifestyle. Please rate your level of agreement/disagreement with each of the following statements related to heart disease and select the answer that best describes your feelings.

- | | SD | D | N | A | SA |
|---|----|---|---|---|----|
| 32. I feel that my chances of developing a heart disease like cardiovascular disease in the future are high because I have a family history (e.g., siblings, parents, grandparents) of heart disease. | 1 | 2 | 3 | 4 | 5 |
| 33. I feel that my chances of developing a heart disease like cardiovascular disease in the future are high because of my lack of physical activity. | 1 | 2 | 3 | 4 | 5 |
| 34. I feel that my chances of developing a heart disease like cardiovascular disease in the future are high because of high blood pressure. | 1 | 2 | 3 | 4 | 5 |
| 35. I feel that my chances of developing a heart disease like cardiovascular disease in the future are high because of high bad cholesterol. | 1 | 2 | 3 | 4 | 5 |
| 36. I feel that my chances of developing a heart disease like cardiovascular disease | | | | | |

in the future are high because of my cigarette smoking habit. 1 2 3 4 5

37. I feel that my chances of developing a heart disease like cardiovascular disease in the future are high because of my sedentary (e.g., sitting or being inactive for long hours) habit. 1 2 3 4 5

Longstanding health problems refer to health issues established in an individual for a long time. Quality of life refers to an individual's general well-being in society. Please rate your level of agreement/disagreement with each of the following statements related to heart disease and select the answer that best describes your feelings.

SD D N A SA

38. If I develop a heart disease like cardiovascular disease, it could lead to longstanding health problems. 1 2 3 4 5

39. If I develop a heart disease like cardiovascular disease, it would have a severe and negative influence on my quality of life. 1 2 3 4 5

A mental health problem refers to anxiety and other forms of depression. Please rate your level of agreement/disagreement with each of the following statements related to mental health and select the answer that best describes your feelings.

SD D N A SA

40. I feel that my chances of developing a mental health problem like depression in the future are high because I have family history (e.g., siblings, parents, grandparents) of mental health problems. 1 2 3 4 5

41. I feel that my chances of developing a mental health problem like depression in the future are high because of intense and/or prolonged insomnia (e.g., sleep less than 3 hours a day for 2 or more weeks, 3 or more consecutive days without any sleep). 1 2 3 4 5

42.

I feel that my chances of developing a mental health problem like depression in the future are high because of my current stress due to whatever circumstances that appear unresolved to the point that I feel hopeless. 1 2 3 4 5

43. I feel that my chances of developing a mental health problem like depression in the future are high because of traumatic events (e.g., witness events such as murder or loss of a loved one). 1 2 3 4 5

Longstanding health problems refer to health issues established in an individual for a long time. Quality of life refers to an individual's general well-being in society. Please rate your level of agreement/disagreement with each of the following statements related to mental health and select the answer that best describes your feelings.

	SD	D	N	A	SA
44. If I develop a mental health problem like depression, it could lead to longstanding health problems.	1	2	3	4	5

45. If I develop a mental health problem like depression, it would have a severe and negative influence on my quality of life.	1	2	3	4	5
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Please rate your level of agreement/disagreement with each of the following statements.

I want to take steps to prevent chronic diseases like lung cancer, high blood pressure, Type 2 diabetes, HIV/AIDS, heart disease, and mental health illnesses....

	SD	D	N	A	SA
46. ...I have a family member or someone very close to me who suffers from one or more of the diseases mentioned.	1	2	3	4	5

47. ...I had a family member or someone very close to me who died of one or more of the diseases mentioned.	1	2	3	4	5
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48. ...I have had symptoms that suggest I could develop one or more of the chronic diseases mentioned.	1	2	3	4	5
--	---	---	---	---	---

49. ...I have seen or heard information related to one or more of the chronic diseases mentioned.	1	2	3	4	5
---	---	---	---	---	---

Next, we will ask you a series of questions about your interest in a health management app. It is very important that you read this description carefully so you can answer questions about the app.

We are developing a health management app and want to know whether you think you might use it.

It is an all-in-one app to help you live healthier in all aspects of your life, including your physical, mental, and nutritional health. The app is meant to help college students like you understand how your current activities and choices relate to living well and, more specifically, help you reduce your chances of contracting preventable chronic diseases in the future.

It will be free, user friendly, enjoyable, and work well on any device you use it -your smartphone, tablet, and laptop/desktop computer. It's also compatible with just about every other fitness and nutrition monitoring device and app on the market (like FitBit and My Fitness Pal, for example).

You will be able to choose what kind of information you want it to track. Plus, it will help you easily and quickly input extra data related to your diet, mental health/mood, sexual activity, alcohol consumption, and exposure to cigarette smoke -whatever you want to track. This will help the app give you ideas and motivation customized just for you so you can live better and avoid preventable chronic diseases.

Using the above description of the health management app, please rate your level of agreement/disagreement with each of the following statements. I think I might use the health management app because of the following benefits:

	SD	D	N	A	SA
50. I believe that the app can be helpful to manage different aspects of my health.	1	2	3	4	5
51. I believe that the app can help me prevent current chronic diseases.	1	2	3	4	5
52. I believe that the app can help me make healthy choices.	1	2	3	4	5
53. I believe that the app can be important for my health.	1	2	3	4	5

Using the above description of the health management app, please rate your level of agreement/disagreement with each of the following statements. I think I might not use the health management app because of the following barriers:

	SD	D	N	A	SA
54. Using the app is trivial (which means not important) thing.	1	2	3	4	5
55. I have no privacy using the app.	1	2	3	4	5
56. Using the app takes time.	1	2	3	4	5
57. In my opinion, a chronic disease is destiny, and the app will not change it.	1	2	3	4	5

Please rate your level of agreement/disagreement with each of the following statements and select the answer that best describes your feelings. I think I might not use the health management app because of the following reasons:

	SD	D	N	A	SA
58. I would avoid learning everything about my health.	1	2	3	4	5
59. When it comes to my health, sometimes ignorance is bliss (which means when you do not know about something, you do not worry about it)	1	2	3	4	5
60. I prefer not to think of chronic diseases.	1	2	3	4	5

Using the above description of the health management app, please rate your level of agreement/disagreement with each of the following statements. I think I might use the health management app because of important people such as:

	SD	D	N	A	SA
61. People whose opinions that I value would like for me to use the app.	1	2	3	4	5
62. People who are important to me think that I should use the app.	1	2	3	4	5
63. People who influence my behavior think that I should use the app.	1	2	3	4	5

Using the above description of the health management app, please rate your level of agreement/disagreement with each of the following statements. I think I might use the health management app because of the following favorable conditions:

	SD	D	N	A	SA
64. The app is compatible with my mobile device or smartphone.	1	2	3	4	5
65. I know how to use the app.	1	2	3	4	5
66. Using the app is entirely under my control.	1	2	3	4	5
67. Technical assistance is available for the app users when needed.	1	2	3	4	5

Using the above description of the health management app, please rate your level of agreement/disagreement with each of the following statements.

	SD	D	N	A	SA
68. I intend to download the app to manage different aspects of my health.	1	2	3	4	5
69. I intend to activate the app to manage different aspects of my health.	1	2	3	4	5
70. I intend to try the app to manage different aspects of my health.	1	2	3	4	5
71. I intend to frequently use the app to manage different aspects of my health.	1	2	3	4	5

We have a few demographics questions, which are very important to our understanding of how different groups of people may differ in their opinions of their health and intent to use a health app.

72. How old are you? Please enter your age.

73. What is your gender?

Male

Female

Other

Prefer not say

74. What is your relationship status?

Same partner for a year or longer

Same partner for 7-11 months

Same partner for 3-6 months

In a potentially long-term relationship that has been established for less than 3 months

Not in a relationship

Other

75. Which race/ethnicity would you consider to be your primary one?

Black or African American

Hispanic or Latino

Native American or American Indian

Asian

Mixed Race

Other

Now, you will be directed to a separate and new link to enter your name and email address for extra credit points purposes only.